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The Sir Richard Stawell Oration.¹

SILVER SPOONS AND GOLDEN GENES.

By SIR ALAN NEWTON,
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I ONCE heard it said of Stawell that his distinguished career was not, after all, so very creditable, because he was born with a silver spoon in his mouth. It is true that he came from a family which can trace its ancestry back to the twelfth century, and that his father, a former chief justice and lieutenant-governor of this State, was able to send him overseas to undergo a course of post-graduate instruction; but this was as far as his silver spoon helped him to travel. Long before the course which he had planned was finished, his spoon was swept away in the financial disaster which is known as the "bursting of the boom", and he was forced to return at once to Melbourne to earn his living as best he could. Perhaps this was lucky for Stawell, because it is well known that the possession of a silver spoon is a hindrance rather than a help to those who essay the steep climb to eminence in medicine. Be this as it may, its loss did not matter much, because, as I told the author of the criticism I have quoted, Stawell's forefathers had bequeathed to him a gift far more precious and permanent, in the shape of those golden genes which are inherited by certain members of one generation after another of families distinguished for scholarly achievement and for service to the State. And so it came to pass that Sir Richard was able to follow his father's example by fostering in his turn in this new country those traditions of straight thinking and right doing which had been cherished by his ancestors in the Motherland.

¹Read at a meeting of the Victorian Branch of the British Medical Association on October 1, 1947.

One of the advantages of this oration is that it gives us an opportunity, once at least in every year, not only to remember Stawell's work, but also to reflect upon what each one of us has done to help this country which we love and this profession of medicine which we are privileged to practise. You will agree that such reflections were never more necessary than now, when it is impossible to feel confident that much is well and all will yet be better with our profession. With this sobering thought in my mind, I have come to the conclusion that I can best repay the great honour the Stawell trustees have done me, first by painting a picture of the man as I knew him, and then by reminding you of two of the more important of his many activities directed towards the improvement of the medical services available to this community. This approach will lead naturally to a discussion of what we are doing ourselves, or in other words, of the use we are making of such golden genes as may have been bequeathed to us, because, mind you, I do not suggest that these are found only in families which can be traced back to the Norman Conquest. Most of us possess some of them, and for that matter, I suppose that most of us belong to families which spring from some Norman or other; all that has happened with the passage of time has been the disappearance of the writing on the signposts which once pointed the way back to him. Of course, there are instances of a mutation of genes from gold into some baser metal. This may not matter much, because the lack of golden genes may have made it easier for these men to acquire silver spoons, some of which they may be persuaded to devote to the advancement of medicine.

There will soon come a time when this oration must be given by men who have not known Stawell, and therefore it behoves those who have enjoyed that privilege to try to find words for the memories of him which they treasure in their hearts. This is no easy task, and for my part I shall seek help from Professor F. Wood Jones, whose departure from this university we have never ceased to lament. You will remember that he pointed out that the central nervous system was made from buried skin, and that, conversely, our skin is unburied nervous system. It

follows that "the outside of the body, or external nervous system, is what others can see, is, in fact, *what we look like*. The internal nervous system dictates our actions and our conduct and is, in fact, *what we are*. . . . Regarded so, we may ask, is it strange that we should look like what we are?"

We can see what Sir Richard Stawell looked like in the portrait which I show you and which the trustees have been good enough to borrow from the Royal Melbourne Hospital for this occasion. It is a posthumous painting by McInnes from a photographic study by Julian Smith, that remarkable man who, after achieving great eminence as a surgeon, turned to photography as a hobby and is now one of the greatest living exponents of this art. A great friend and chosen colleague of Stawell's, he has given us a picture of him as he lived. I would that it was possible for the trustees to arrange that this picture should be published with every future oration, because, more convincingly than can be done with words, it shows Stawell as he was—a leader of men, a wise physician, a cultured scholar. I feel sure that you will agree, as you gaze upon it, that whatever may have happened to the silver spoon, the golden genes are plainly to be seen.

But I must resist the temptation, ever present on an occasion like this, to make an image of Stawell "lifelike but lifeless, wonderful but dead". Many of you must share with me memories of him as a learned and valued consultant, of great experience and sound judgement, whose meticulous care in examining a patient was equalled only by that with which he recorded his findings. It was no wonder that he became the chosen and cherished adviser of innumerable people in all walks of life. But you must remember him also in lighter moods. Indeed, if you look again upon his portrait, you may detect just such a ghost of a smile as was seen long ago by Dr. Blois Lawton when, after they had both endured in silence a fatuous address at a meeting presided over by an episcopal dignitary, Sir Richard murmured: "Dreary! Very dreary! . . . Even for an archbishop."

Then there were those luncheons at his house—there were always guests at luncheon—when, the meal and some serious discussion ended, Sir Richard would relax for a few minutes and tell, perhaps, some stories of his early days in practice. There was the greengrocer whose child he had cured, who could not pay in cash, but who paid in kind by sending bunch after enormous bunch of bananas, until the whole house stank of this fruit and it was Sir Richard who had to pay in cash to have them carted away. Then there was that frightful early experience when, to oblige an old friend who needed a holiday from his general practice, he consented to act as his *locum tenens*, on the strict understanding that there was not the slightest chance of any midwifery work. But, of course, some woman had made a mistake in her sum, and to his horror he was sent for to deliver her. Feeling that she would derive more benefit from his absence than from any active help he could give, he solved the problem by hiding behind a hedge near the house until he heard the baby cry, when he rushed in, breathless. Or, perhaps, he would recall that time, long ago, when Hamilton Russell, Jeffreys Wood, Percy Webster and the founder of this oration, Stawell's great friend, A. E. Rowden White, all of whom lived in his house and shared the expenses, met solemnly one night and decided that Dick must sack the cook. This was not a cheerful prospect for any man; but, with his usual sagacity, he began to prepare her for the fate in store by giving, on rising next morning, a good imitation of a man in a temper. He banged all the doors, shouted at the others and then, in some trepidation, sent for the cook. When she came, he nearly embraced her, for she said at once: "Dr. Stawell, I must give you a week's notice."

But the time for tales such as these was all too short. For many years he did the work of two men; but, though his appointment book was always full for weeks to come, he was ever punctual and never hurried. Sharp at two o'clock, off went the guests and back to his work he would go to take up an ever-increasing load. Indeed, the time came all too soon when his verdict was looked upon as final, with the result that, as I once heard him sadly remark,

he became a little weary of being the immediate precursor of the undertaker. Fortunately, before he had reached this more sombre stage in the career of an eminent consultant, he had found comfort in his happy marriage and in his children. His wife lightened his burdens, and in fact took some completely away. For example, it was no longer his duty to sack the cook, which perhaps was just as well, because by this time there were fewer cooks to sack.

I suppose that, in this attempt to depict a wise and cultured physician who was also a witty and very human person, desire has outrun performance, and I must comfort myself as best I can with the hope that some other friend of his will paint a picture in better perspective in some future Stawell Oration. As for me, I must now do my best to inspire you to emulate him, by reminding you, as I promised, of two aspects of his life's work, which were directly related, not to the personal treatment of sick people, but to the improvement of the standard of medical treatment available to the community. I refer to his work as a politician, if I may use this term, in the field of hospital administration, and to his work as a pedagogue, or if you prefer it, as a clinical teacher.

Stawell inherited from his Anglo-Irish forebears that hatred of injustice, delays and selfish opposition, together with that resentment of ignorance, intolerance and stupidity, which, controlled as they were by the limitations of courtesy and softened by a sense of humour, were priceless attributes when applied to the task of achieving reforms. In addition, he was forceful and far-sighted; in short, the very antithesis of that wavering soul who delays action until he is sure of the approval of the great majority of his colleagues and who is known in our slang as a "fence-sitter". It followed that, during his long period of service as a member of the Board of Management of the Royal Melbourne Hospital and, later, as its president, he formed one of a small and powerful group which included Syme, Moore, Boyd and Zwar, and was responsible with them for the conversion of a provincial hospital into the great institution we view with such pride today.

He was instrumental in abolishing the pernicious system of election by subscribers to positions on the medical staff of the hospital, and substituting for it an advisory board upon which the council of the University of Melbourne, the faculty of medicine and the honorary staff of the hospital are represented. He was a consistent advocate of the transfer of the hospital to its present site near the university. He helped in the creation of that department of pathology at the hospital which developed into the great Walter and Eliza Hall Institute of Research in Pathology and Medicine. He jealously guarded the traditions of the clinical school and inspired in all those who taught, or were taught, in it an eagerness to give of their best in the service of the sick poor. When this spirit forsakes us, then indeed we shall cease to be members of a profession and become merely artisans in a trade.

There was never a time when we should pray more fervently that our leaders may be endowed with the qualities which enabled Stawell to accomplish these reforms than today, when we hear politicians ignorantly advocating a change which may lead the practice of medicine into the abyss. It is tragic that neither politicians, nor for that matter many members of the public, understand the traditions which govern the conduct of those who devote their lives to the practice of medicine. This fact was brought home to me not long ago when a member of the Commonwealth Government expressed astonishment that one of his relatives, who had been involved in a road accident, was operated upon in the middle of the night at a public hospital by a well-known surgeon, who refused to charge a fee. What was to me a commonplace incident was to him a remarkable circumstance. It may seem to the layman just as remarkable that many doctors are, like Stawell, constantly striving to improve the standard of medical service available to the community. I am now approaching the end of a long professional life, in which it has been my good fortune to see the work done by many physicians, and I have no hesitation in saying that at least 90% of them are very fine men indeed. I need not look further than the presidential

chair for an example of this splendid spirit in the profession. I feel sure that Dr. A. E. Coates would agree that it was the noble traditions of medicine which inspired him and his brother officers, who were prisoners of the Japanese, to show the world to what heights doctors could rise in the service of the sick. But it is inevitable that these traditions, and indeed the whole existing system of medical practice, which has been so carefully planned to give service to all, must be given short shrift by a government determined to provide a free nationalized medical service as another step along the road to a complete control of manpower.

It is not generally understood that a "free" medical service and a "nationalized" medical service do not necessarily mean the same thing. The term "free medical service" is a misnomer; somebody must pay for it. The phrase is used to denote a system in which the cost is not borne by the sick man alone, but is widely shared. No doctor would fail to sympathize with such an aim, and in point of fact, plans which could achieve it without imperilling the efficiency of the medical service have been drawn up by its leaders. But these plans have not found favour with the Government, which desires to provide "free" medical treatment by abolishing private practice and substituting for it a nationalized and regimented medical service. As you know, a nationalized service cannot affect me personally, and therefore I can take an objective view of this proposal. I do not fear that my profession will become impoverished as a result of nationalization; my fear is lest it gain the whole world and lose its own soul. An example of the manner in which nationalization may cause some doctors to become debauched by wealth and to forsake their professional traditions is not far to seek. This statement is no mere form of words. You know as well as I do that if our profession loses its soul, there will be a change for the worse in its devotion to duty and in the skill its members display in the treatment of the sick, and that this change will be followed immediately by a rise in the mortality and morbidity rates. The tragedy is that both the public and its politicians are too ignorant of medical matters to be able to recognize this change for the worse when it comes.

Is it unreasonable to suggest to the Government that the best way to solve this highly technical problem is by the appointment of some doctors whom they can trust, and whom the medical profession can respect, to meet our leaders in order to determine how a "free" medical service can be introduced without peril to the health of the community? It may be urged that such a conclave would be abortive, because doctors know nothing about organization. The answer to this fallacious argument is to be found in the story of the very successful organization by doctors of their profession and its equipment to meet service and civil needs during the war.

But this suggestion of a professional council is, of course, disrespectful. It is well known that the majority of political leaders soon acquire what I may term a "let there be light; and there was light" complex, which enables them to dictate the precise technique required to solve medical, or indeed, any other esoteric problems, and so we witness the spectacle of a Minister meeting representatives of the medical profession merely to tell them what he and his Government have decided shall be done. Naturally enough, these decisions conform to the general plan of creating a socialistic State, and are not primarily directed towards the improvement of the health of the people. In these circumstances I feel sure that Stawell, who was brought up on the writings of John Bunyan and Bishop Wilberforce, would have cried: "No dealings with Diabolus as long as Mansoul stands." Let us do the same. Let us tell the people that they can have free medicine if they wish, but that nationalized medicine would be free poison. One more word before I leave this subject. I cannot refrain from expressing the hope that my church and all other churches—that my profession and all other professions—will rally to the support of those Roman Catholic prelates who have had the wisdom to detect and the courage to denounce the present political trend in this country. If we do not unite to fight for freedom, we shall deserve to be slaves.

So much for politics; now let us turn to a study of Stawell as a pedagogue. He returned from England in the nineties of the last century, deeply impressed by the methods of clinical teaching adopted in London, particularly the Socratic method of question and answer ruthlessly pursued until the student had arranged his facts with due regard to the relationship of each to the others. At that time the standard of clinical teaching in Melbourne was low, and Stawell set to work at once to improve it, more particularly in regard to the correct detection and interpretation of physical signs in diseases of the chest and the nervous system. He instituted his famous Sunday morning tutorials at the Children's Hospital, which were attended by all fifth year students except a few of the weaker brethren, who were unable to endure the pitiless cross-examination which "Dicky", as they called him, conducted at almost every step of their pilgrimage to the goal of clinical competence. He continued this system of instruction when he was appointed early in this century to the staff of the Royal Melbourne Hospital, and was unquestionably a most inspiring clinical teacher. I think it true to say that, in this, man's most generous function, he was unsurpassed. Realizing as he did that a student's reaction to a subject depended largely upon the manner in which it was presented to him by his teacher, he poured out his powers with the utmost liberality in order to arouse enthusiasm for the work. There were always a few souls whose lack of comprehension caused him to be, perhaps, a little unrestrained in his criticism—I well remember that my answer to the first question he addressed to me evoked the terse comment "idiot"—but nobody minded this much, because all knew that:

A little ginger 'neath the tail
Will oft for lack of brains avail.

Until the day came when he taught no more, students went forth year by year from the hospital into the world, blessing his name because he had given them such knowledge and understanding of medicine that they could face the future unafraid.

I myself am among the number who bless him, just as, I suppose, are many of you. I think the most vivid memory of my medical course relates to an amiable but worthless person, dead long ago, called Cornelius McBride, who fell out of a four wheeler cab onto his head when going to the Melbourne Cup. I can still hear Dicky say: "This is Cornelius McBride, examine him and give me your opinion when I come here again in three days' time." So there was I, alone with the wretched Cornelius, who endured my examination until I had elicited the fact that he had an upper motor neurone lesion of the lower limbs, a lower motor lesion of the upper limbs, and loss of sensation to temperature and pain in the skin of the trunk. There followed a frenzied search in the library for an explanation of these phenomena and, in due course, a report to Dicky. The praise which he gave me still rings in my ears today when the transient pleasure caused by winning one or two exhibitions or scholarships has long since been forgotten.

That, of course, is the way to teach medicine; but how few know it! How many still adopt purely didactic methods, going from bed to bed, pouring out sections of textbooks to avid students, who eagerly absorb what they can, to vomit it forth as an ill-digested mess at examination time and then to forget all about it. Let us forget such methods of teaching for the moment and review what we have done ourselves to follow the example set by Stawell, by improving the quality of clinical teaching in our day. I have no doubt that, like me, you have listened to many fatuous discussions on clinical teaching in the past, and now you must reconcile yourselves to another which may be just as vacant. The only justification for it is the fact that a real attempt has been made during the last six months to improve this teaching, and you may be interested in a short account of what has been done. I warn you not to expect new ideas, because, after all, no idea is new; the only thing that is novel and difficult is the task of persuading people to accept any sort of change. Indeed, I think it fortunate that this medical school was not founded when the subject of astrology formed part of the medical course, because, in that event, there would be a

lecturer in this subject today, complete with a seat on the Faculty of Medicine and jealously guarding a series of lectures at which attendance was compulsory.

There is one address upon medical education which certainly does not merit inclusion in the "fatuous" category. It was the presidential address upon "The University and Clinical Teaching", given by Professor P. MacCallum to this Branch in December, 1946. You will remember the logical eloquence with which he described the ideal relationship between university and clinical schools, and recall his advocacy of chairs in medicine and surgery. I cordially agree with this suggestion, but must emphasize, as he did, the importance of establishing departments as well as professorships. There must be no repetition of the farce perpetrated in the case of the chair of obstetrics, where, after the salary of the professor has been paid, barely enough money remains to provide a typist and a telephone. Chairs in medicine and surgery mean an annual expenditure of at least £40,000, in addition to an initial capital cost of approximately £150,000. Needless to say, there is no immediate prospect of obtaining this money, despite the fact that the creation of such chairs would be of much greater benefit to the community than the provision of free medicines. A bottle of tonic "free" will catch more votes than can be swayed by the appointment of a brace of professors. All that can be done therefore is for all of us to join in the search for some benevolently disposed person who wishes to use a very large silver spoon in the real service of the people, by creating departments which will radiate knowledge of the prevention and cure of disease throughout the community.

Professor MacCallum, doubtless to point his argument for the establishment of these chairs, gently upbraids the clinicians for their indifference towards the more scientific side of medicine. This is perhaps well deserved; but I feel sure that he will forgive me if I point out, just as gently, that there was a time when the university was not so very favourably disposed towards the improvement of the clinical side. In point of fact, the clinicians attempted to atone for this indifference by themselves creating that department of pathology which has grown into the finest flower of medical life in Australia—the Walter and Eliza Hall Institute of Research in Pathology and Medicine. But today, thanks to Professor MacCallum and others, this divergence of viewpoint has gone, and both academicians and clinicians are working together to advance medical education in our midst. It is a symbol of this union that the university can reap some of the glory gained by the institute, through the appointment, at small cost to itself, of the director of the institute as its professor of experimental medicine. This appointment does not absolve it from the duty of creating chairs in clinical medicine and clinical surgery.

But the fact that the creation of these chairs is still no more than a mirage on the horizon does not mean that nothing can be done to improve clinical teaching. Perhaps the first significant step was the acceptance by the university of the responsibility for clinical teaching in the final years of the medical course, instead of its leaving this work, as hitherto, entirely to clinicians of the three clinical schools. These men had not only carried on the teaching for many years, but had also freely given a large proportion of the clinical fees they received for it to foster scientific developments in their respective clinical schools. They had been handicapped in their work by many factors, notably by the lack of continuous supervision of the students working in the hospitals. These problems were materially the same at the three schools, and it was agreed that they could best be solved, now that the university had entered the clinical field, if the three schools were regarded as parts of a Melbourne school of medicine rather than as separate entities, each developing upon its own line.

As a first stage of this transformation, an attempt has been made to integrate the systematic lectures in medicine and surgery given at the university with the clinical lectures given at the hospitals. This attempt has brought about some improvement in correlation of these two sets of lectures, and the action of the university in making its

facilities for the supply of visual aid techniques available to hospital lecturers free of charge has helped to raise the general standard. There is little doubt that, with greater experience, the interlocking of the two sets of lectures will be further developed.

Then followed the next and the more important step—namely, the appointment to each clinical school of a full-time clinical supervisor, paid by the university at the rate applicable to a senior lecturer. These men do not reside at the hospital, but may hold concurrently an honorary appointment to its staff, preferably that of an associate. As officers of the university they are responsible to it for the efficient performance of their duties, but are subject, of course, to the by-laws and regulations enacted by the hospital boards of management, to which, incidentally, their names were submitted before their appointments were confirmed. The first three clinical supervisors appointed were Dr. G. Brosnan (Saint Vincent's Hospital), Dr. G. L. Grove (The Alfred Hospital) and Dr. G. C. McKenzie (Royal Melbourne Hospital), all of whom had graduated some years earlier and possessed distinguished academic and war service records. They began work at the beginning of the second term of this year, and have already displayed marked ability and enthusiasm. It is safe to say, even at this early stage, that these appointments have been a great success.

These men are not to be regarded as members of a "Gestapo" appointed to spy upon and to oppress the unhappy student; still less are they to be looked upon as reinforcements to the "walkie-talkie" brigade of clinical teachers—there are enough of these already. Their chief function will be best illustrated if I remind you of the whimsical Sitwell entry in "Who's Who": "Educated at Eton and Oxford; mainly self-educated." The important point of this statement is that there is time for self-education at both Eton and Oxford. The time available to the student for self-education—for the "Cornelius McBride" type of education—in our clinical schools has steadily diminished. It must be restored, and the students must be encouraged to use it to the fullest extent possible. This, then, is the chief task of the new university officers, and, as I have said, they have begun it well. They are encouraging students to keep complete records of the patients allotted to them, and when each history is completed, to attach thereto a short summary of the disease, indicating which of the signs and symptoms noted in the history were typical and which were atypical. Furthermore, they will require each student to keep a cross-index of his records, in the hope that he will establish a habit which will not be abandoned when he goes out to practise his profession, and which will help to provide that mass of assessable clinical facts, the lack of which today has been so justly criticized by Professor MacCallum. It is proposed also to allot students to "firms", or teaching units, including both indoor and outdoor sections, so that they will be able to add to their case-histories the "follow-up" notes which form such an essential part of clinical records. It goes without saying that the student should not be content to keep records merely of patients admitted to the wards, but must also keep histories of those who come as out-patients, because, after all, the greater part of his professional life will be spent doing this very thing, and the sooner he learns to do it well the better.

This is not the place to describe the duties of these officers in other than a general manner. It will be obvious that they must arrange that all the clinical material available in each clinical school is being used in the instruction of students, and that interference with the time available for clinical work, whether this is caused by the necessity for attendance at special courses or by anything else, is reduced to a minimum. They must keep a complete record of the work done by each student from the time he enters the hospital until his graduation, which must include the names of all patients allotted to him, the manner in which he has performed his clinical duties and the reports furnished by each of his clinical teachers. They must know what every student should be doing in each working hour of every day, and must ensure that every student has seen examples of all the common diseases during his hospital course.

The university supervisors at the three clinical schools keep closely in touch with each other and hold frequent consultations. It follows that valuable methods of teaching introduced at one school are brought to the attention of the other two. As a further step in this direction, an interchange of students for one Saturday morning in every month takes place between the three clinical schools. This not only gives the students an entry into other schools than their own, but also engenders a healthy spirit of competition between the clinical teachers of the three schools. It is hoped, in addition, to establish an exchange system of a clinical teacher from one school to another for two or three months in each year. This suggestion has been accepted in principle by the respective boards of management, but the precise details of the plan have yet to be confirmed. All the foregoing revisions of the old order are designed to promote the point of view that there is only one Melbourne medical school and not three independent clinical schools.

The examination system can be converted into a powerful stimulus to the student to do clinical work, and with this end in view, the old system of asking him to perform out-of-date operations upon a formalin-hardened corpse has been replaced by an examination in practical surgery and surgical methods in the casualty room. The student is asked to suture wounds, reduce dislocations, apply plaster casts, make beds, and in short, supply evidence that he has profited from his clinical instruction. Another incentive has been given by the abolition of the system of awarding competitive marks to "pass" candidates, so that their appointment to hospital resident positions will depend in future more upon the information about their energy and ability supplied by the clinical school in which they trained than upon the accident of being placed "forty-fifth or sixty-sixth" in the pass list in the final examination. It goes without saying that the hospital report will be given the most earnest consideration by the examiners at the final examination, when they come to decide whether any particular candidate will obtain honours or a pass, or will be rejected. It may be that all these innovations will fail in their purpose; but at least it is encouraging to learn that a hospital sister recently said: "I do not know what has happened to the students; they were here at 8 o'clock this morning asking for work to do", and to discover that the time-honoured "solo" school in the students' quarters has received a severe blow. But the most important comment upon the new system is to be found in the 1947 annual report of the Dean of the Alfred Hospital, who states, apropos of the new university appointments, that "never before in the history of the School has co-ordination of University and Hospital teaching been so successfully realised nor have the details of clinical work been so thoroughly integrated".

But the problem of clinical instruction does not end with the introduction of reforms in the work done by the students; it is equally important to review the quality of the teaching. We cannot all be born Stawells, but there is an art in teaching which can be learnt, at least to some extent, and therefore it is important that, when we consider the students' curriculum, we should also consider the teachers' curriculum. Clinical lecturers and tutors are university officers, and instruction in the technique of teaching should be given to them as it has been to those occupying similar positions in other faculties. This is not all, because, in the faculty of medicine, it is important to keep clinical teachers fully informed of advances in the basic sciences, which are being taught in pre-clinical years and form the foundation upon which the clinical edifice is to be built. It is unnecessary to stress the importance to the student of relating what is learnt in each year to the knowledge which has been gained in earlier years and which must be acquired in the years to come—a task which can be satisfactorily performed only if clinical and academic teachers keep closely in touch with each other.

It must not be thought that efforts to improve the system of medical education in the Melbourne medical school are concerned only with the clinical portion of the course. All the teachers, both clinical and pre-clinical, are cooperating in the work of adapting the curriculum to

meet modern needs. There is general agreement that graduation should be possible without undue delay, by reduction of the total length of undergraduate training; that from the beginning of the course it should be so arranged that one subject leads logically to the next; that increased attention should be given to social and industrial medicine and to the fact that the patient is a human being—not just a case; that minor diseases should receive more attention; that the undergraduate course should be followed by good post-graduate opportunities; and that the whole curriculum should be kept under constant review, it being understood that nothing new is to be introduced into its undergraduate portion unless something is first thrown out in order to make room for it.

This work requires and is receiving the close attention of all those responsible for medical teaching in this university, notably of Professor P. MacCallum and Professor R. D. Wright, their colleagues, the deans of the clinical schools and their sub-deans and others too many to mention. I wish to make this clear lest you should give me credit for what has been done and what is to be done very soon. There is, nevertheless, one final point which has been impressed upon me during this last year, when I have been able to watch much of the work done throughout the school and the associated hospitals. This is the need for the appointment of some individual as a coordinator of medical studies—call him a director or what you will. At present the course may be likened to a splendid carpet on the loom, marred, however, by some flaws which pass unobserved by the workers, because each of them is completely absorbed in fashioning one part only of the intricate general pattern. There should be somebody whose sole duty it is to review the work as a whole and to report the presence of any defects in it.

And now I come to the end of this oration. I am reminded that it was Stawell's habit, at the end of the day, to slip into Saint Paul's Cathedral to listen to Evensong, to reflect upon his attitude to the world rather than upon the world's attitude to him and to pray for the future of the school to which he had given so much. I think that his prayers will be answered. I do not believe that a school which has produced men like Dunhill, Mathison, Kellaway, Neil Fairley and Burnet will fall from grace. Indeed, it is evident that, though silver spoons may have vanished forever from professional life, golden genes are present in abundance in the young men who have returned from the wars to this medical school, and that, in the years to come, there will be many who will seek example and find inspiration in the story of Stawell.

INVESTIGATION OF BENZOL AND TOLUOL POISONING IN ROYAL AUSTRALIAN AIR FORCE WORKSHOPS.

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DURING 1944 an investigation was undertaken by the Royal Australian Air Force Directorate of Hygiene and Number 1 Flying Personnel Research Unit to determine the effects, if any, of contact with aromatic naphthas by Royal Australian Air Force members working in air force workshops. Considerable work had been done earlier on the ventilation and other precautions necessary in workshops, particularly dope and spray painting workshops; but the decision to undertake a large scale investigation was precipitated by the death of an airman from agranulocytosis and thrombocytopenia. This airman,

aged thirty-two years, had been employed for two months, during one and a half hours per day, cleaning engine parts with kerosene and petrol after the parts had been removed from a cleaning fluid of high benzol content; zinc chromate spraying was also carried on in the hangar and "the fumes were rather thick" during spraying. The post-mortem report submitted by Lieutenant-Colonel Barlow stated that examination of bone marrow smears revealed aplasia of the leucocyte and platelet elements, although the red cells appeared to be affected to a lesser degree. He concluded from this and the patient's history

TABLE I.

Location.	Benzene Concentration. (Parts per Million.)
Over open vat	180
One foot away from open vat	50
Tray raised above vat, sample six inches from tray	750 to 1,400
Tray raised above vat, sample one foot from tray	215
Tray raised above vat, sample 2 feet from tray	100
Tray raised with parts draining, sample six inches from tray	1,400
Tray raised with parts draining, sample one foot from tray	530
Hosing area	Up to 100
Engine dismantling area	10 for 70% to 80% of the day; up to 130 for short periods

of benzol contact that the condition was due to benzol poisoning, and that other personnel in contact with benzol should be investigated. Professor J. B. Cleland, Marks Professor of Pathology at the University of Adelaide, and Dr. J. B. Thiersch, Neale Research Pathologist, were consulted and agreed with the diagnosis. The Director-General of Medical Services decided to sponsor an investigation to study the effects of benzol and its homologues

TABLE II.

Zones.	Mean Concentration. (Parts per Million.)
I. Over an open vat	180
II. Within two feet of raised tray (loaded)	530
III. Within two feet of raised tray (unloaded)	215
IV. Hosing zone	50 ¹

¹ This figure is probably excessive for complete hosing time.

at aircraft depots, as the larger workshops were congregated at these units. The aim of the investigation was to determine whether the case cited above should be attributed to personal idiosyncrasy, or whether extensive arrangements should be made for periodic blood examinations of all personnel in contact with benzol in Royal Australian Air Force workshops.

The lines followed in the investigation were as follows.

1. An analysis was made of the fluids used by the Royal Australian Air Force: (i) benzol-containing

materials, (a) fluids used for the cleaning of engine parts, (b) rubber adhesives used in sealing "Sisalkraft" packages; (ii) toluol, xylol and other aromatics, exclusive of benzol, used in paint removers and paint thinners in dope and spray painting workshops.

2. An estimation was made of the aromatic hydrocarbon content of the atmosphere in Royal Australian Air Force workshops: (i) in engine cleaning workshops and in packing rooms, (ii) in doping and spray painting workshops.

3. An estimation was made of the inorganic-organic sulphate ratio in urine as a measure of the benzene absorbed by the lungs. This test was performed only on personnel engaged in engine cleaning.

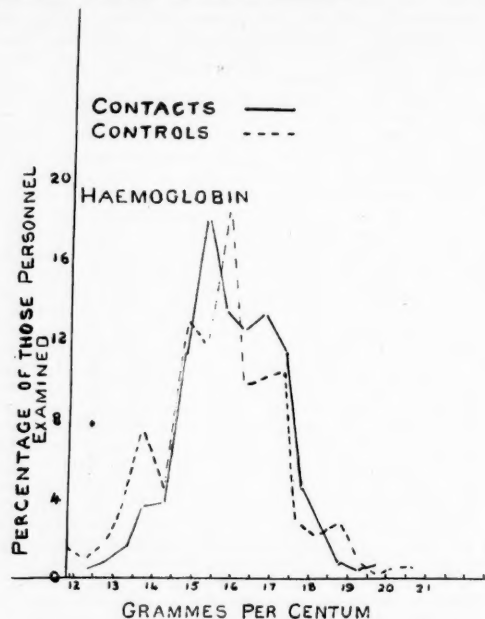


FIGURE I.

4. An investigation was carried out into the blood state of the personnel involved, (i) in engine cleaning workshops and packing rooms, (ii) in doping and spray painting shops.

An Analysis of the Fluids Used by the Royal Australian Air Force.

Benzol Content of Engine Cleaning Fluids.

Two engine cleaning fluids were in use. They contained varying proportions of benzol, cresylic acid, ammonia and other constituents. The benzol content of one fluid was 53%, and of the other 19%.

TABLE III.
Maximum and Mean Daily Exposures in Minutes in Various Zones.

Worker.	Number of Days on Vats.	Zone I. 180 Parts per Million.		Zone II. 530 Parts per Million.		Zone III. 215 Parts per Million.		Zone IV. 50 Parts per Million.	
		Mean.	Maximum.	Mean.	Maximum.	Mean.	Maximum.	Mean.	Maximum.
A	9	1	3	9	17	6	11	3	18
B	8	1	1	6	18	3	9	10	22
C	6	4	9	Nil	Nil	Nil	Nil	10	18
D	5	4	8	1	2	Nil	Nil	16	24
E	4	Nil	4	4	5	2	5	14	20
F	4	Nil	Nil	6	8	5	8	19	26
G	4	1	1	13	17	9	17	27	50
H	3	5	9	4	11	5	9	4	12
J	3	5	9	Nil	Nil	Nil	Nil	14	28
K	2	Nil	Nil	10	12	5	9	4	7

Benzol Content of Rubber Adhesives.

Various rubber adhesives were used in sealing "Sisal-kraft" packages; their benzol content varied between 10% and 30%.

Aromatic Hydrocarbon Content of Paint Thinners and Removers.

Royal Australian Air Force specifications stipulate that all paint thinners and the paint remover in general use shall contain no benzol. During the investigations a series of random samples were taken and were analysed in detail at the Munitions Supply Laboratories, whose report was as follows:

The samples of thinners vary from 16% to 56% in their toluene content. No benzene was detected in the analyses; and a consideration of the errors of the methods leads us to believe that, if benzene is present, it is present in amounts to less than 1% of the samples.

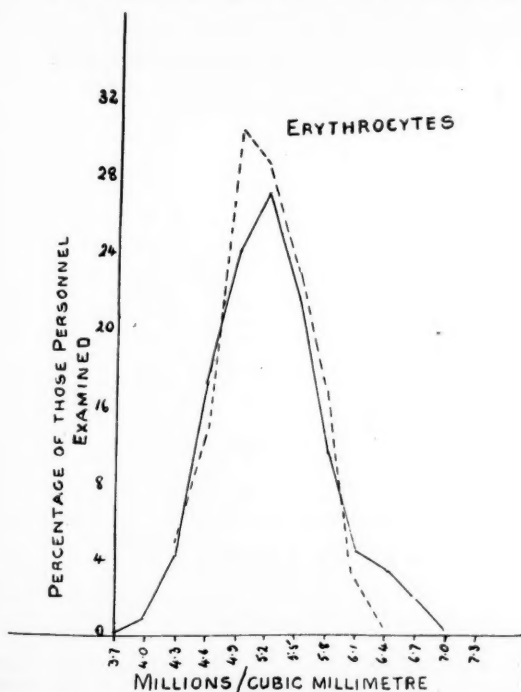


FIGURE II.

Estimation of the Aromatic Hydrocarbon Content of the Atmosphere in Royal Australian Air Force Workshops.

The work on the aromatic hydrocarbon content of the atmosphere in Royal Australian Air Force workshops was carried out by one of us (F.C.) by means of the method published by the Department of Scientific and Industrial Research (Great Britain). The test is not specific to benzene, but includes toluene and other solvent naphthas (xylene and higher homologues).

Engine Cleaning.

The process of engine cleaning consisted of the immersion of engine parts in a cleaning solution. After an engine was dismantled, most or all of the parts were loaded on to a tray and immersed in a large vat containing the cleaning fluid. The vat was closed, and the parts were left in the solution for twenty-four hours in the case of the stronger cleaning fluid (53% benzol), and for forty-eight hours in the case of the weaker cleaning fluid (19% benzol). When the vat was reopened the parts were removed, hosed and scrubbed. At Number 1 Depot the tray was raised mechanically and allowed to

drain for some minutes. It was then removed by hand to a hosing area. The greatest concentration of benzol in the atmosphere occurred after the vats were opened, when the engine parts were draining above the solution from a height above the men's heads and the heavy benzol vapour streamed down past their breathing zone. The concentration of benzol in the atmosphere fell rapidly after the vats were closed. At Number 7 Depot the concentrations of benzol were lower, owing to a difference in technique, described below.

The variations in atmospheric content of benzol can be seen from the following two estimations.

1. At Number 1 Depot, where the stronger cleaning fluid (53% benzol) was used, and unloading was done by hand after the parts had drained above the vat, the concentrations at various sampling positions are shown in Table I. The tests were carried out under normal working conditions, and samples were taken at a height of four feet six inches above the floor.

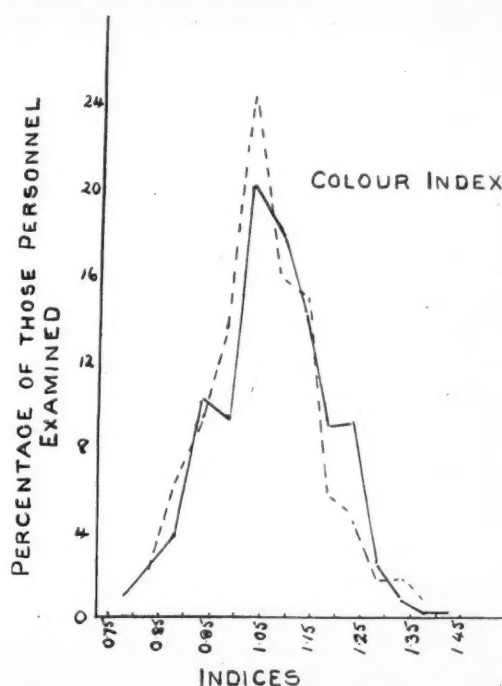


FIGURE III.

Some of these concentrations vary considerably according to weather and ventilation conditions. In the hosing area the concentrations are mostly 50 parts per million before hosing is commenced; but greater values are obtained when air movement carries fumes from the nearby open vats or from the trays raised and draining above the vats. When no movement of the air is apparent, the concentration of benzol vapour drops very rapidly to a negligible figure after a few minutes' hosing.

The quantity of engine parts draining from the trays and the height to which the trays are raised vary the concentration of benzol breathed by the operators.

Those working on the vats were timed with a stop watch in various zones, to which the mean concentrations in Table II were applied.

Table III shows the maximum and mean daily exposure in the four zones for each worker, during a period of nine working days from November 13 to November 24, 1944. Over this period the amount of work done in the vats was considered to be less than that of previous months. With an irregular flow of motors through the

cleaning vats over this period, some of the workers were employed on the vats for only a few days out of the nine.

Exposure of fitters dismantling engines in the engine-cleaning shop was assessed by the taking of samples in this area, at a height of three feet six inches above the floor, and at intervals throughout the day. The results of these tests show concentrations from zero to 130 parts per million. With vats open and trays draining, concentrations varied between 15 and 130 parts per million, according to the conditions of ventilation and to the time during which the vats were uncovered. While the vats were covered, the concentrations were less than 10 parts per million. These conditions existed for approximately 70% to 80% of the working day. These men were included in the blood investigation as benzol contacts.

At Number 7 Depot, where the weaker cleaning fluid (19% benzol) was used and unloading was carried out mechanically without draining, the findings were as follows.

When parts are being removed from the vats, the loaded tray is removed on the overhead hoist, placed

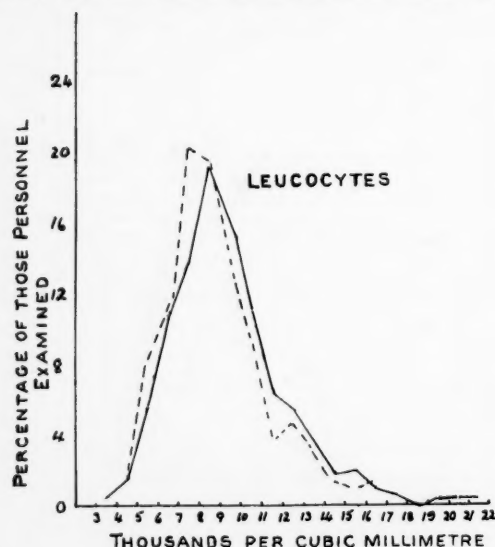


FIGURE IV.

in a kerosene vat, and then removed to the hosing area. In this way parts are not handled by the workers until after the hosing, and thus the workers are not exposed to high concentrations—as is the case at Number 1 Depot—during draining and removal of trays by hand. For the final cleaning, parts are sprayed with white spirit. White spirit is a mixture of kerosene and cleaning petrol, and contains some aromatic hydrocarbons which yield positive results to the tests used for estimating benzol content. These are not considered so toxic as benzene, but very little information is available about their effect on human beings.

The tests showed that workers in the hangar, other than those engaged on the vats, may be exposed to concentrations up to 150 parts per million, according to the ventilation, the amount of work in progress, and the distance away from the vats. For the greatest part of the day, however, the concentration is less than 35 parts per million. All workers in this area were included in the blood investigation as benzol contacts.

Doping and Spray Painting Shops.

Brush doping is done in ventilated workshops supplied with 30 changes per hour of warm filtered air. Spray doping and spray painting are carried out under varying conditions; much of the work is done in these workshops, care frequently being taken to spray directly into an

exhaust vent. Much spray painting is done in hangars or outside on the tarmac. Where possible, however, spray painting is done in a spray booth, erected either in one of these ventilated workshops or in an annexe.

The degree of exposure thus entailed varies enormously, not only with the conditions of ventilation, but also with the type of component being sprayed, which may vary from a series of small articles to whole aircraft. It is impossible to assess the exposure of any particular operator, as both the type and the location of the work vary from time to time, apart from a change of job or change of unit.

Measurement of solvent naphthas in the atmosphere was made in two ventilated paint shops, and the results are given below.

Number 1 Depot paint shop was ventilated by the supply of 30 changes per hour of warmed filtered air,

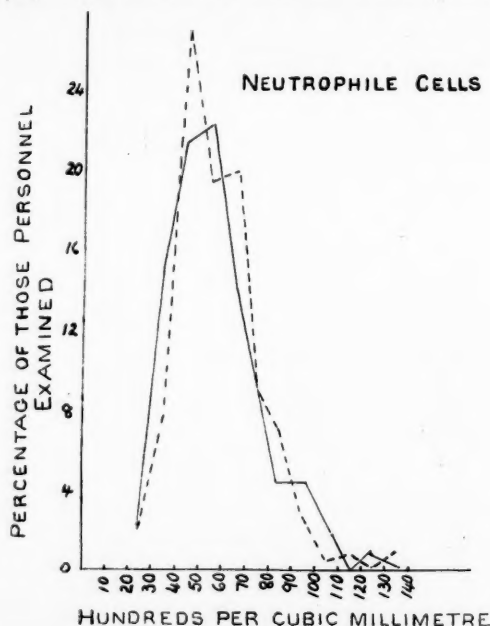


FIGURE V.

and was used for the spraying of small air frame components. Vapour concentrations were 100 to 600 parts per million. During spray painting of components placed on the floor over an exhaust vent, the mean concentration breathed was 200 to 250 parts per million. Later a spray booth was installed and carried the spray directly from the job, apparently without contaminating the breathing zone of the operator. No tests were made of the atmospheric contamination, but little or no added smell of solvent was discernible during actual spraying.

Number 7 Depot paint shop contained two small spray booths for the spraying of engine parts. The tests showed the benzol concentration to be less than 30 parts per million.

Sulphates in Urine.

Urine samples were taken from 13 persons working in the engine cleaning shop at Number 1 Depot at the end of the day on January 16, and in the morning and afternoon of January 17. The percentage of inorganic to total sulphates was estimated gravimetrically by the methods employed by Jephcott and Bulmer.⁶⁰ No control estimations were made, but previous workers have shown the normal range to be 80% to 100%. The figures for all except one subject, who gave a figure of 78.8% in the morning and 86.2% on the same afternoon, fell within these limits. It has been the experience of other workers that subjects of benzol absorption usually show the

lowest figures in the afternoon as a result of exposure during the day.

It was concluded that the figures for all 13 subjects were within the normal limits.

Blood Investigation.

The blood investigations were carried out by one of us (S.D.) with the assistance of a technician and two orderlies.

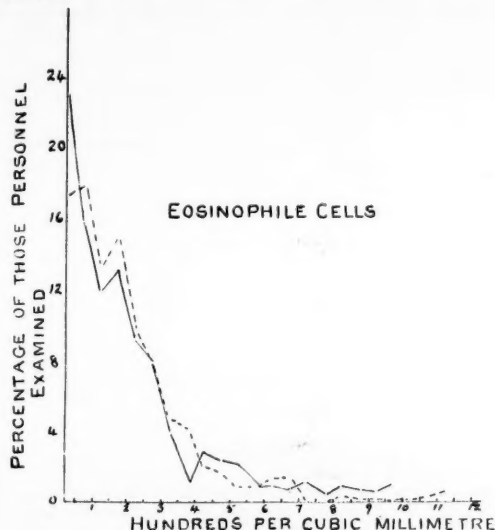


FIGURE VI.

A preliminary survey was made of the literature to ascertain the criteria of benzol poisoning and the standards of normality established by previous investigators. From the review which follows, it will be appreciated that this information is not clearly established as yet.

As a final picture, many cases of aplastic anaemia, myelocytæmia and lymphocytæmia have been cited. In

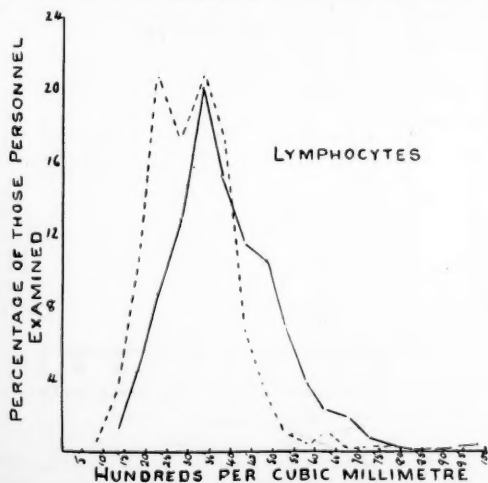


FIGURE VII.

the cases of aplastic anaemia the red cell, white cell and platelet elements have been depressed in the blood stream, although the bone marrow has been either hypoplastic or hyperplastic. However, there is much disagreement as to the early signs of benzol poisoning. Four large surveys and one smaller survey have recently been made.

Greenburg, Mayers, Goldwater and Smith, in 1938,⁽¹⁾ examined 332 pressmen of rotogravure printing, New York State Department of Labour, working in an atmosphere of 11 to 1060 parts per million of benzol, and found the order of frequency of abnormality to be as follows: (i) a diminution in the number of erythrocytes; (ii) an increase in mean corpuscular volume; (iii) a reduction in the number of platelets in the blood; (iv) a reduction in hæmoglobin value; (v) a reduction in the number of leucocytes. They also found that subjects with abnormal

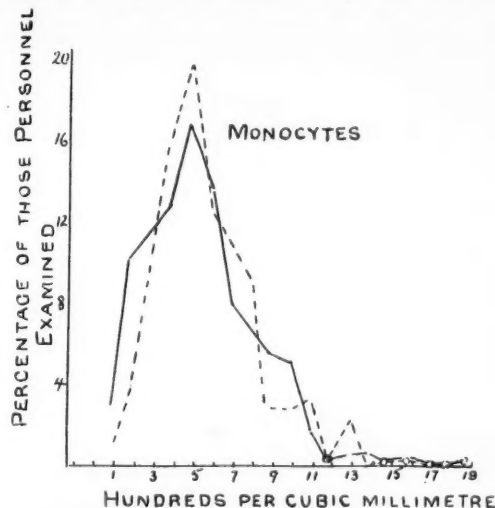


FIGURE VIII.

blood might be symptomless, and that those with symptoms might have normal blood. They reached the following conclusion:

A reduction in number and an increase in size of the red cells would appear to be an early sign of benzol poisoning. It is believed that a macrocytosis should be looked on with suspicion in absence of other abnormalities.

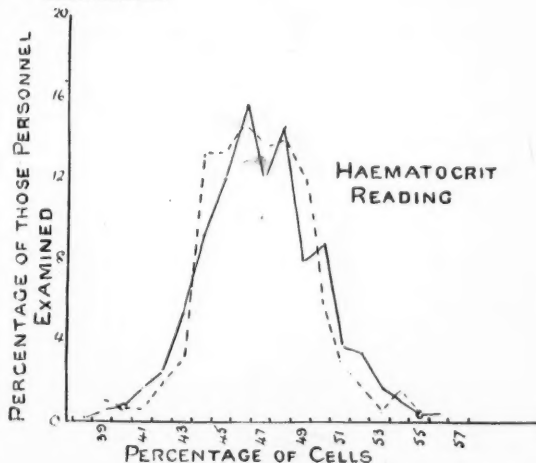


FIGURE IX.

These workers thought that a complete blood count should be made, that there are enormous differences in susceptibility, and that overweight increases that susceptibility.

Francis T. Hunter, in 1939,⁽²⁾ examined 89 men from leather and rubber cement plants working in atmospheres varying between 10 and 420 parts per million. He found

that although 21 had only one abnormality, not one had leucopenia without other abnormality. Four were found to have elevation of the number of erythrocytes, four depression of the erythrocytes, four a slightly elevated number of leucocytes, one an increase in the polymorphonuclear percentage and two a decrease in the polymorphonuclear percentage; 20 had eosinophilia and three marrow cells as their only abnormality. Hunter concluded that "the early diagnosis depends on the evaluation of the complete blood picture rather than upon the existence of

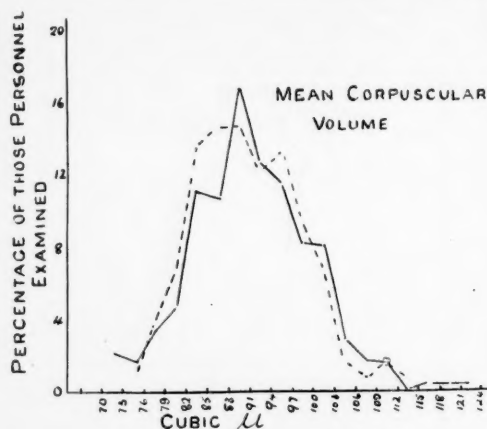


FIGURE X.

neutropenia", and that "the first signs of poisoning may appear with the onset of an infection long after the exposure has ceased".

Rex H. Wilson⁽⁵⁾ made a survey by a full blood count of 1104 people working in the rubber industry in atmospheres of five to 500 parts per million with an average of 100 parts per million, and decided that most important of all was the fall in the total number of leucocytes. He found the number of polymorphonuclear cells decreased, that of the monocytes increased, and the red cell count,

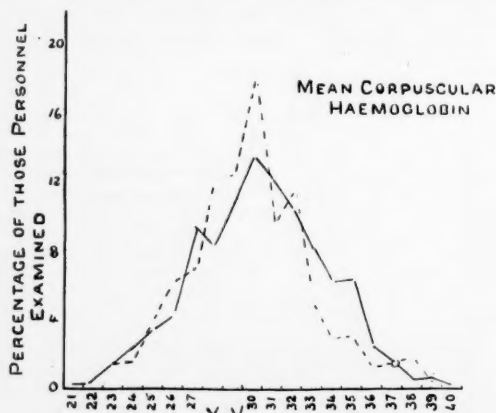


FIGURE XI.

the haemoglobin value, and the number of platelets diminished; but he did not state their order of frequency.

Hamilton-Paterson and Browning⁽⁶⁾ in England, in 1944, examined 200 female benzol contacts working with industrial rubber, and 200 controls. They found that neutropenia was the commonest and earliest sign of benzol poisoning, and that symptoms and blood picture showed no correlation.

Donald Hunter, Milton, Perry, Barrie, Loutit and Marshall⁽⁷⁾ in 1944 examined 411 female and 117 male benzol contacts from aeroplane dope and rubber works, who were breathing atmospheres containing from 0.9 to 31.5 parts per million, and 309 female and 98 male controls. They found no significant variation in the blood pictures.

The Committee of Benzol of the National Safety Council in Chicago in 1926 decided that a leucocyte count below 5600 per cubic millimetre was a clear indica-

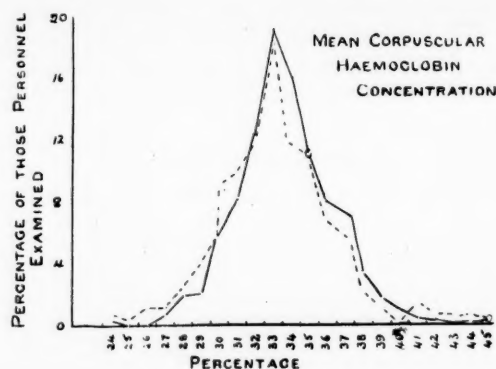


FIGURE XII.

tion of benzol poisoning. However, Osgood, Brownlee, Osgood and Cohen⁽⁸⁾ in a survey of the normal range of leucocytes at the University of Oregon, gave a set of figures accepted by Whitby and Britton in their text book "Disorders of the Blood". The number of leucocytes ranges from 4000 to 11,000 per cubic millimetre. Thus the statement of the Committee on Benzol (quoted above) cannot now be accepted.

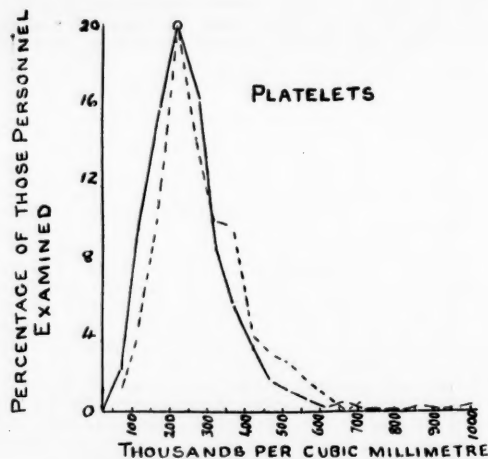


FIGURE XIII.

The standards of normality adopted in the above surveys of benzol contacts can be gauged from the summary given below.

Greenburg, Mayers, Goldwater and Smith⁽⁹⁾ stated that they found the order of blood abnormality to be as follows: (i) a diminution of the number of erythrocytes below 4,500,000 per cubic millimetre; (ii) an increase in mean cubic volume above 94 cubic μ; (iii) a reduction in the number of platelets in the blood below 10,500 per cubic millimetre; (iv) a reduction in the haemoglobin

value below 13 grammes *per centum*; (v) a reduction in the number of leucocytes below 5000 per cubic millimetre.

F. T. Hunter⁽²⁾ regarded figures outside the following ranges as abnormal: (i) number of erythrocytes between 4,500,000 and 5,200,000 per cubic millimetre; (ii) number of leucocytes between 6000 and 9900 per cubic millimetre; (iii) polymorphonuclear leucocyte percentage between 60 and 80; (iv) absolute count of polymorphonuclear cells between 4500 and 7900 per cubic millimetre; (v) percentage of eosinophile cells 3.0 or less.

Wilson⁽³⁾ did not state his standards.

Hamilton-Paterson and Browning⁽⁴⁾ used for their criteria a system of *plus* signs. One *plus* sign was given for the following: (i) hæmoglobin value below 80% on

TABLE IV.
Comparison of the Hæmoglobin Values in the Contact and Control Groups.

Hæmoglobin Value. (Grammes per 100 Mils.)	Contacts.		Controls.	
	Number.	Percentage.	Number.	Percentage.
11 to 11.9	—	—	4	1.36
12 to 12.9	5	0.85	7	2.37
13 to 13.9	29	4.96	33	11.19
14 to 14.9	85	14.53	50	16.95
15 to 15.9	181	30.94	88	29.84
16 to 16.9	148	25.30	57	19.32
17 to 17.9	89	15.21	38	12.88
18 and above	48	8.19	18	6.10

the Haldane scale (11.2 grammes *per centum*) with either macrocytic or microcytic anæmia; (ii) number of leucocytes below 5500 per cubic millimetre; (iii) number of polymorphonuclear leucocytes below 3000 per cubic millimetre; (iv) number of eosinophile cells above 160 per cubic millimetre, with the total leucocytes below 5500 per cubic millimetre; (v) suggestive symptoms. Three *plus* signs were considered suggestive, and four or five were diagnostic in the absence of other cause.

D. Hunter, Milton, Perry, Barry, Loutit and Marshall⁽⁵⁾ used their own controls.

However, according to Osgood *et alii*, standard (v) given by Greenburg *et alii* and standards (ii), (iii) and (iv) given by Hamilton-Paterson *et alii*, are not abnormalities at all; and according to Whitby and Britton, standards (i)

TABLE V.
Comparison of Erythrocyte Counts in the Contact and Control Groups.

Erythrocytes. (Millions per Cubic Millimetre.)	Contacts.		Controls.	
	Number.	Percentage.	Number.	Percentage.
Below 4.5	32	5.45	14	4.7
4.5 to 4.7	77	13.12	32	10.74
4.8 to 5.0	117	19.93	79	26.51
5.1 to 5.3	135	23.00	73	24.5
5.4 to 5.6	112	19.08	52	17.45
5.7 to 5.9	56	9.54	38	12.75
6.0 to 6.2	25	4.26	9	3.02
6.3 and above	33	5.62	1	0.34

and (ii) of F. T. Hunter are too limited, standards (iii) and (iv) are too high, and standard (v) is too low. Thus it is very difficult to know what standards to use in assessing benzol and toluol poisoning, and we at first decided to use the male standards of normality given by Whitby and Britton in their text book "Disorders of the Blood", which are as follows: hæmoglobin value, 14 to 17 grammes *per centum*; red cells, 4,500,000 to 6,400,000 per cubic millimetre; colour index, 0.85 to 1.15; leucocytes, 4000 to 11,000 per cubic millimetre; neutrophil leucocytes, 1500 to 7500 per cubic millimetre; eosinophile leucocytes, 0 to 400 per cubic millimetre; basophile leucocytes, 0 to 200 per cubic millimetre; lymphocytes, 1000 to 4500 per cubic millimetre; monocytes, 0 to 800

per cubic millimetre; hæmatocrit reading (average), 47; mean corpuscular volume, 78 to 94 cubic μ ; mean corpuscular hæmoglobin content, 27 to 32 micromicrogrammes; mean corpuscular hæmoglobin concentration, 32 to 38%; number of platelets, 250,000 to 500,000 per cubic millimetre. We took the range of hæmatocrit reading to be 40 to 50 (Osgood)⁽⁶⁾

The fact that a person's figures fall outside these limits does not mean that that person is necessarily abnormal; but there is a big chance of his being so; 95% of those examined in Osgood's leucocyte survey fell within these ranges. Hamilton-Paterson and Browning's survey was made on women workers only, and their standard of 11.2 *per centum* of hæmoglobin is lower than Whitby and

TABLE VI.
Comparison of Colour Index in the Contact and Control Groups.

Colour Index.	Contacts.		Controls.	
	Number.	Percentage.	Number.	Percentage.
Below 0.85	17	2.9	6	2.03
0.85 to 0.90	23	3.92	18	6.10
0.90 to 0.94	60	10.24	27	9.15
0.95 to 0.99	54	9.22	39	13.22
1.00 to 1.04	118	20.14	72	24.41
1.05 to 1.09	103	17.58	47	15.93
1.10 to 1.14	84	14.33	44	14.92
1.15 to 1.19	53	19.04	17	5.76
1.20 to 1.24	53	9.04	13	4.41
1.25 and above	21	3.58	12	4.06

Britton's standard of 12 grammes *per centum* for females. (Though some women were examined in the course of our investigation, the numbers were small and have been excluded from the report.)

When 66 Royal Australian Air Force benzol contacts had been investigated, it was found that only 9.6% fell within the above ranges for all factors. This very low figure was sufficiently serious to need further investigation. As the standards quoted above were amassed in various countries, not including Australia, it was decided to make a set of control investigations on Royal Australian Air Force personnel who had had no contact with benzol or its homologues.

TABLE VII.
Comparison of Leucocyte Counts in the Contact and Control Groups.

Leucocytes. (Thousands per Cubic Millimetre.)	Contacts.		Controls.	
	Number.	Percentage.	Number.	Percentage.
Below 4.0	0	0	1	0.34
4.0 to 4.9	11	1.84	6	2.01
5.0 to 5.9	35	5.86	24	8.05
6.0 to 6.9	64	10.72	35	11.74
7.0 to 7.9	82	13.74	61	20.47
8.0 to 8.9	115	19.26	58	19.46
9.0 to 9.9	91	15.24	38	12.75
10.0 to 10.9	66	11.06	29	9.73
11.0 to 11.9	41	6.87	10	3.36
12.0 to 12.9	32	5.36	14	4.70
13.0 to 13.9	21	3.52	9	3.02
14.0 and above	39	6.55	13	4.37

Procedure.

The procedure adopted was to take a medical and occupational history, and then to make a detailed blood examination, consisting of red and white cell (total and differential) counts, hæmoglobin and hæmatocrit estimations, calculations of mean corpuscular volume, mean corpuscular hæmoglobin content and mean corpuscular hæmoglobin concentration, and a platelet count.

Contacts.

Five hundred and eighty-seven contacts were examined. Three depots were visited—namely, two aircraft depots

and one stores depot, the contacts being drawn from two types of workshops: (i) those contaminated by benzol and (ii) those contaminated by toluol and other homologues. Those contaminated by benzol were subdivided as follows: (a) engine cleaning shops; 56 subjects were tested, including those actually working at the vats containing cleaning fluids, and those in the vicinity of the vats or of the parts that had been through the vats; (b) packing rooms; 31 subjects from stores depot packing rooms, engaged in sealing "Sisalkraft" packages with a rubber solution containing benzol, were tested. The workshops contaminated by toluol and other homologues consisted of dope and spray painting workshops and hangars. Five hundred subjects were examined, comprising both the actual painters and other members working in the adjacent atmosphere.

TABLE VIII.

Comparison of Neutrophile Cell Counts in the Contact and Control Groups.

Neutrophile Cells. (Hundreds per Cubic Millimetre.)	Contacts.		Controls.	
	Number.	Percentage.	Number.	Percentage.
10 to 19	16	2.73	6	2.01
20 to 29	90	15.36	24	8.05
30 to 39	129	22.01	81	27.18
40 to 49	133	22.70	58	19.46
50 to 59	83	14.16	60	20.13
60 to 69	57	9.73	28	9.40
70 to 79	28	4.78	23	7.72
80 to 89	28	4.78	9	3.02
90 and above ..	22	3.75	9	3.03

Controls.

Three hundred controls were examined, drawn from various non-flying units. Care was taken in the selection to get a comparable control group. Medical category, type of work, conditions of living and freedom from infection were taken into consideration.

The majority of both contact and control groups were living-in personnel, who were engaged in ground duties and had non-sedentary occupations. Storemen, cooks, guards, medical orderlies and trainees made up the numbers. These men were questioned closely as to their civil occupations, and those who had contact with aromatic hydrocarbons were excluded. Both groups were questioned

TABLE IX.

Comparison of Eosinophile Cell Counts in the Contact and Control Groups.

Eosinophile Cells. (Hundreds per Cubic Millimetre.)	Contacts.		Controls.	
	Number.	Percentage.	Number.	Percentage.
0 to 0.4	137	23.22	52	17.45
0.5 to 0.9	93	15.76	53	17.79
1.0 to 1.4	70	11.86	40	13.42
1.5 to 1.9	78	13.22	45	15.10
2.0 to 2.4	55	9.32	29	9.73
2.5 to 2.9	47	7.97	24	8.05
3.0 to 3.4	23	3.90	14	4.70
3.5 to 3.9	7	1.19	12	4.03
4.0 to 4.4	17	2.88	6	2.01
4.5 and above ..	63	10.69	23	7.73

about the occurrence of any headaches, dizziness, loss of weight, bleeding, bruising, nausea, vomiting or other complaints. At first lassitude was specifically mentioned; but it brought forth so many facetious remarks that it was left to be volunteered under "other complaints".

Statistical Review.

After the technical work was completed, the figures were tabulated and graphed, and taken over by one of us (P.M.G.), who made the statistical analysis.

The figures were first tabulated in two groups, one comprising the 587 contacts and the other the 300 controls, and these groups were compared statistically. Later the

87 benzol contacts were subtracted, and the group of 500 toluol contacts was compared with the control group.

It was noticed, as the work progressed, that those who had been longest in the Royal Australian Air Force appeared to be in better health than those with short service records, and so both contact and control groups were divided into six monthly service groups and compared statistically.

The medical investigation showed that 24.1% of the benzol contacts, 38.6% of the toluol contacts and 12% of the controls complained of some or all of the symptoms listed above without other apparent cause.

Tables IV to XVII and frequency polygons (Figures I to XIII) give a summary of the results of the blood investigation. They represent in one group all contacts with benzol

TABLE X.

Comparison of Lymphocyte Counts in the Contact and Control Groups.

Lymphocytes. (Hundreds per Cubic Millimetre.)	Contacts.		Controls.	
	Number.	Percentage.	Number.	Percentage.
Below 10	—	—	1	0.34
10 to 14	7	1.19	11	3.69
15 to 19	25	4.36	30	10.07
20 to 24	52	8.87	63	21.14
25 to 29	74	12.63	52	17.45
30 to 34	117	19.97	63	21.14
35 to 39	88	15.02	37	12.42
40 to 44	67	11.43	21	7.05
45 to 49	61	10.41	11	3.69
50 to 54	39	6.66	3	1.01
55 and above ..	56	9.55	6	2.03

and toluol and their homologues, and in the other the controls. The statistical assessments were made from detailed figures, but the condensed tables are included for the reader's information.

The statistical comparisons of the above groups show small but significant differences in the case of haemoglobin value, numbers of platelets, leucocytes and lymphocytes, mean corpuscular haemoglobin content, and mean corpuscular haemoglobin concentration. With the exception of the number of platelets, the contact group has the higher average values. In general the distribution in the two

TABLE XI.

Comparison of Monocyte Counts in the Contact and Control Groups.

Monocytes. (Hundreds per Cubic Millimetre.)	Contacts.		Controls.	
	Number.	Percentage.	Number.	Percentage.
0.0 to 0.9	18	3.07	3	1.01
1.0 to 1.9	59	10.07	12	4.04
2.0 to 2.9	69	11.77	36	12.12
3.0 to 3.9	75	12.80	48	16.16
4.0 to 4.9	99	16.89	59	19.87
5.0 to 5.9	79	13.48	38	12.79
6.0 to 6.9	47	8.02	34	11.45
7.0 to 7.9	53	9.04	27	9.09
8.0 to 8.9	33	5.63	9	3.03
9.0 to 9.9	30	5.12	9	3.03
10.0 and above ..	24	4.09	22	7.43

groups is similar, differences in mean values, *et cetera*, being relatively small. The distributions for lymphocytes show the most pronounced differentiation. When the benzol workers were subtracted from the total contacts and the resultant group was compared with the controls, there was very little alteration; in the same factors significant differentiation was apparent, although in some instances at a different level. Statistical results are shown in Tables XIX and XX.

Haemoglobin value, hematocrit reading and colour index all show a tendency to increase as length of service increases in the control group. In the contact group the increase is slight and is less than in the control group.

In the latter, low mean value for "0 to 6 months" is mainly responsible. The number of monocytes tends to decrease as length of service increases. Statistical results are shown in Table XXI.

Although we have used our own controls as the criteria of benzol and toluol effect, we thought it would be valuable to tabulate the figures expressing both contacts and controls as percentages falling within the normal ranges as given by Whitby and Britton.

While statistical examination of the figures in Table XVIII reveals that the contact group differs significantly from the control group with regard to the percentages for colour index, lymphocytes, mean corpuscular hæmo-

TABLE XII.

Comparison of Hematocrit Values in the Contact and Control Groups.

Hematocrit Values. (Per centum.)	Contacts.		Controls.	
	Number.	Percentage.	Number.	Percentage.
Below 40	4	0.69	3	1.03
40	4	0.69	2	0.69
41	9	1.56	2	0.69
42	14	2.43	6	2.06
43	30	5.21	9	3.09
44	52	9.03	38	13.06
45	68	11.81	38	13.06
46	89	15.45	42	14.43
47	68	11.81	39	13.40
48	83	14.41	40	13.75
49	45	7.81	35	12.03
50	50	8.68	18	6.19
Above 50	60	10.42	19	6.52

globin concentration and platelets contained in the normal range as given by Whitby and Britton, nevertheless the fact, as indicated later, that the Royal Australian Air Force control group in itself differs significantly in many findings from the normal range of Whitby and Britton lessens the importance of such a result.

Conclusions.

It would appear from the contact-control statistics, without reference to length of service, that early stimulation of the bone marrow was manifesting itself in the increased hæmoglobin value, mean corpuscular hæmoglobin content, mean corpuscular hæmoglobin concen-

TABLE XIII.

Comparison of Mean Corpuscular Volume in the Contact and Control Groups.

Mean Corpuscular Value. (Cubic μ .)	Contacts.		Controls.	
	Number.	Percentage.	Number.	Percentage.
Below 76	27	4.70	3	1.03
76 to 78	18	3.13	10	3.44
79 to 81	43	7.48	19	6.53
82 to 84	64	11.13	40	13.75
85 to 87	62	10.78	42	14.43
88 to 90	95	16.52	42	14.43
91 to 93	72	12.52	35	12.03
94 to 96	66	11.48	39	13.40
97 to 99	47	8.17	28	9.62
100 to 102	46	8.00	20	6.87
103 and above ..	35	6.08	13	4.47

tration, and leucocyte and lymphocyte values. However, when length of service was taken into account, it was found in the control group that the hæmoglobin value, hematocrit reading and colour index all showed a tendency to increase as the length of service increased. As the average length of service for the contact group was 32.2 months, and that for the controls 20.2 months, this longer period of service among the contacts might account for the higher hæmoglobin value and thus the higher mean corpuscular hæmoglobin values; but it almost certainly does not account for the higher mean corpuscular hæmoglobin concentration, in view of the fact that the hæmato-

crit value is also increased. Thus, in the whole group of contacts with benzol, toluol and their homologues, as compared with our own control group, we are left with small significant rises in mean corpuscular hæmoglobin concentration and in the numbers of leucocytes and of lymphocytes, and a small significant fall in the number of platelets.

TABLE XIV.

Comparison of Mean Corpuscular Hemoglobin Content in the Contact and Control Groups.

Mean Corpuscular Hemoglobin Content. (Micromicrogrammes.)	Contacts.		Controls.	
	Number.	Percentage.	Number.	Percentage.
Below 26	42	7.18	20	6.78
26	24	4.10	18	6.10
27	53	9.06	21	7.12
28	47	8.03	35	11.86
29	64	10.94	37	12.54
30	76	12.99	54	18.31
31	72	12.31	30	10.17
32	61	10.43	34	11.53
33	46	7.86	15	5.08
34	36	6.15	9	3.05
35	38	6.50	9	3.05
36 and above ..	26	4.44	13	4.41

Although many of the figures obtained are outside the ranges for normality given by Whitby and Britton, the blood pictures of the benzol and toluol workers are not very different from those of the other ground staff members of the Royal Australian Air Force, and the small effect on hæmopoiesis amongst the contacts, in spite of high intermittent concentrations of benzol and toluol in the atmosphere of certain workshops, seems to reflect the enormous variety, not only in the degree of concentra-

TABLE XV.

Comparison of Mean Corpuscular Hemoglobin Concentration Values in the Contact and Control Groups.

Mean Corpuscular Hemoglobin Con- centration. (Percentage.)	Contacts.		Controls.	
	Number.	Percentage.	Number.	Percentage.
30 and below ..	59	10.40	52	18.05
31	47	8.20	28	9.72
32	70	12.35	35	12.15
33	109	19.22	53	18.40
34	90	15.87	36	12.15
35	63	11.11	32	11.11
36	46	8.11	20	6.94
37	41	7.23	16	5.56
38	20	3.53	6	2.08
39 and above ..	22	3.88	11	3.83

TABLE XVI.

Comparison of Platelet Counts in the Contact and Control Groups.

Platelets. (Thousands per Cubic Millimetre.)	Contacts.		Controls.	
	Number.	Percentage.	Number.	Percentage.
99 and below ..	13	2.21	3	1.01
100 to 149	56	9.52	12	4.03
150 to 199	115	19.56	43	14.43
200 to 249	141	23.98	72	24.16
250 to 299	117	19.90	54	18.12
300 to 349	73	12.41	41	13.76
350 to 399	32	5.44	40	13.42
400 to 449	20	3.40	11	3.69
450 to 499	8	1.36	8	2.65
500 and above ..	13	2.21	14	4.70

tion in the atmosphere, but also in the type and location of the work.

Certain conclusions emerge from this research.

Firstly, we consider that there is no need for routine blood examinations of men working in Royal Australian Air Force engine cleaning and painting workshops, pro-

TABLE XVII.

Subjects.	Hæmoglobin Value. (Grammes per Centum.)	Erythrocytes per Cubic Millimetre. (Millions.)	Colour Index.	Leucocytes per Cubic Millimetre. (Thousands.)	Neutrophils per Cubic Millimetre. (Hundreds.)	Eosinophile Cells per Cubic Millimetre. (Hundreds.)	Lymphocytes per Cubic Millimetre. (Hundreds.)	Monocytes per Cubic Millimetre. (Hundreds.)	Hæmatocrit Percentage.	Mean Corpuscular Volume. (Cubic μ .)	Mean Corpuscular Content. (Micromicrogrammes.)	Mean Hæmoglobin Concentration. (Percentage.)	Platelets per Cubic Millimetre. (Thousands.)
<i>Benzol contacts:</i>													
Maximum	18.6	6.3	1.3	19.6	127.0	9.6	56.0	13.6	56.0	120.0	38.0	40.0	520
Mean	14.4	5.1	1.08	50.6	50.6	1.7	32.0	5.6	46.0	91.0	31.0	33.0	243
Minimum	12.7	3.9	0.83	4.3	19.0	0	13.0	0.8	40.0	77.0	23.0	28.0	60
<i>Tobac and higher homologues contacts:</i>													
Maximum	20.0	7.3	1.4	21.0	125.0	9.9	97.0	18.7	56.0	121.0	40.0	44.0	1,000
Mean	16.0	5.3	1.05	46.6	46.6	1.9	38.3	4.9	46.9	89.7	30.2	33.6	263
Minimum	12.3	3.7	0.75	4.1	11.0	0	10.0	0	33.0	57.0	21.0	24.0	49
<i>Controls:</i>													
Maximum	20.8	6.3	1.36	17.7	127.0	11.3	79.0	18.0	55.0	114.0	39.0	45.0	720
Mean	15.6	4.3	1.04	8.7	49.0	1.9	29.4	5.3	46.7	90.3	29.9	33.1	285
Minimum	11.5	4.2	0.80	3.4	11.0	0	8.0	0.5	39.0	73.0	23.0	24.0	70

vided that exposure is minimized by attention to conditions of work. The following are examples of the steps taken to provide good working conditions (these are of course supplemented by supervision by the unit medical officer):

1. Local ventilation of doping and spray painting workshops, the principle of spray booths with air movement of not less than 100 linear feet per minute for spray painting, and dope rooms with not less than 20 changes of air per hour being adopted, and with advice on precautions to be taken when the work must be done in hangars or out of doors. With engine cleaning, the principle adopted has been as follows: when only one or two vats are needed, these are to be placed outside in a lean-to shelter, and when a large number of vats are necessary, exhaust ventilation is to be installed on the side of the vats opposite the operator.

2. Advice on personal precautions and arrangement of work—for example, to spray down wind or towards the exhaust fan, and to avoid standing between component and fan during spraying or while component is drying, together with the use of syphon or pump (not buckets) when vats are being filled with cleaning fluids or emptied.

3. Advice that members shall not be kept continuously on engine cleaning for more than two months, but transferred for an equal period to work in an area free from hazardous fumes.

4. The arrangement of monthly medical review for all persons working in the relevant workshops.

TABLE XVIII.

Percentage of Figures within Whitby and Britton's Ranges for Normality.

	Contacts.	Controls.
Hæmoglobin value	71	66
Erythrocytes	92	95
Colour index	75	84
Leucocytes	85	88
Neutrophile Cells	89	92
Eosinophile Cells	86	90
Lymphocytes	73	93
Monocytes	85	87
Hæmatocrit reading	89	92
Mean corpuscular volume	59	61
Mean corpuscular hæmoglobin content	64	72
Mean corpuscular hæmoglobin concentration	77	68
Platelets	43	52

Secondly, there is none the less a risk of unsuspected exposure of men in air force workshops, in view of the wide variety of work undertaken. New processes involving the use of changing solvents are constantly being introduced (for example, the rubber cement used for sealing "Sisalkraft" packages, the solutions used in repair of rubber belly tanks), and benzol-containing or other hazardous chemicals may then be used in ill-ventilated buildings, or without other necessary precautions. There is, therefore, an urgent need for close cooperation between the technical services and the medical services, in order that adequate precautionary measures may be issued with the technical instructions, and the new process set up with the cognizance of the unit medical officer.

Thirdly, we conclude that the airman who died from aplastic anaemia and thrombocytopenia (if, as seems likely, he suffered from benzol poisoning) was unusually susceptible to the effects of benzol exposure.

Fourthly, being aware of the varying conditions of work in air force workshops, we are strongly of the opinion that there can be no comparison of the results obtained in this survey with factory work in which both the job and the workshop remain more or less constant and the degree of exposure is therefore steady.

Fifthly, the differences between the blood pictures of the 300 Royal Australian Air Force controls and the standard figures given by Whitby and Britton are, to say the least, arresting, and where statistical data of the Royal Australian Air Force control group can be compared with similar material from Price-Jones (quoted by Whitby and Britton—namely, with regard to hæmoglobin

value, red cell count, leucocyte count, haematocrit percentage, mean corpuscular volume, mean corpuscular haemoglobin content, and mean corpuscular haemoglobin concentration) the Royal Australian Air Force means differ significantly from those of the English group everywhere except in haematocrit values. This suggests the desirability of an early investigation of a typical Australian group with a view to establishing true Australian normals. The comparison of the results of various surveys of the normal blood picture with food surveys

made in the corresponding countries would be of great interest.

Summary.

1. An investigation was undertaken to determine the effects, if any, of benzol and its homologues on Royal Australian Air Force personnel working in air force workshops.

2. An analysis of the fluids containing aromatic hydrocarbons used by the Royal Australian Air Force included

TABLE XIX.¹
Summary of Comparisons between the First Group (made up of all the Contacts) and the Control Group.

Observation.	χ^2 .	Contacts (I).		Controls (II).		Difference (I)-(II).		Remarks.
		Mean.	S.D. ²	Mean.	S.D. ²	Mean.	S.D. ²	
Hemoglobin value ..	33.40 (10 D.F.) ³	16.0	1.32	15.6	1.52	0.37	0.099 ⁴	Greater percentage of low values among the controls, which are more dispersed than the contacts.
Erythrocytes ..	18.36 (6 D.F.) ³	5.2	0.56	5.2	0.44	0.06	0.037	Contact group are more dispersed about the central value than the control group.
Colour index ..	14.11 (8 D.F.)	1.06	0.111	1.04	0.106	0.02	0.008	No significant differentiation.
Leucocytes ..	14.95 (10 D.F.)	9.3	2.72	8.8	2.50	0.56	0.187 ⁴	Significant shift towards higher values in the contact group.
Neutrophil leucocytes	20.86 (8 D.F.) ³	47.4	20.33	49.0	19.19	-1.6	1.42	Difference mainly in the centre of the range in the classes within the "normal" range of 20 to 80.
Eosinophil leucocytes	11.36 (10 D.F.)	1.9	1.88	1.9	1.77	0.01	0.131	No differentiation.
Lymphocytes ..	89.19 (8 D.F.) ³	37.4	12.87	29.4	10.23	8.0	0.857 ⁴	There is a significant shift towards higher values in contact group.
Monocytes ..	26.47 (10 D.F.) ³	5.0	2.78	5.4	2.76	-0.3	0.197	Higher percentage of low values in the contact group.
Haematocrit reading	14.92 (12 D.F.)	46.9	2.92	46.7	2.66	0.21	0.204	No significant differentiation.
Mean corpuscular volume	9.61 (9 D.F.)	90.0	8.73	90.3	7.56	-0.3	0.601	No significant differentiation.
Mean corpuscular haemoglobin content	21.36 (12 D.F.) ³	30.3	3.23	29.9	3.02	0.4	0.226 ⁴	A slight indication of a higher average value in the contact group, which also has a higher percentage of high values.
Mean corpuscular haemoglobin concentration.	15.31 (11 D.F.)	33.7	2.73	33.1	3.09	0.53	0.206 ⁴	Control group shows a higher proportion of low values, and a general shift towards lower value.
Platelets ..	34.37 (8 D.F.) ³	25.1	102.0	284.0	105.0	-33.0	7.32 ⁴	Contact group shows a significant shift towards lower values relative to the control group.

¹ In Table XIX above, the value of χ^2 was obtained by comparing the proportions in the various classes of the two groups, the means and standard deviations, and by the assessment of any significant differentiation.

² Significant at the 5% level.

³ Significant at the 1% level.

⁴ Significant at the 0.1% level.

⁵ Standard deviation.

⁶ Degrees of freedom.

TABLE XX.¹

Observation.	χ^2 .	Contacts (I).		Controls (II).		Difference (I)-(II).		Remarks.
		Mean.	S.D. ²	Mean.	S.D. ²	Mean.	S.D. ²	
Hemoglobin value	28.524 (10 D.F.) ³	16.0	1.34	15.6	1.52	0.36	0.103 ⁴	Greater percentage of low values among the controls, which are more dispersed than the contacts.
Erythrocytes ..	20.378 (6 D.F.) ³	5.3	0.57	5.2	0.44	0.08	0.038 ⁴	Contact group tend to be more dispersed about a slightly higher central value than the control group.
Colour index ..	12.957 (8 D.F.)	1.05	0.113	1.04	0.106	0.01	0.0081	No significant differentiation.
Leucocytes ..	17.675 (10 D.F.)	9.3	2.73	8.7	2.50	0.58	0.193 ⁴	Significant shift towards higher values in the contact group.
Neutrophil leucocytes	22.503 (8 D.F.) ³	46.9	20.41	49.0	19.19	-2.1	1.462	Difference mainly in the centre of the range in the classes within the "normal" range of 20 to 80.
Eosinophil leucocytes	10.839 (10 D.F.)	1.9	1.92	1.9	1.77	0.04	0.136	No significant differentiation.
Lymphocytes ..	99.623 (7 D.F.) ³	38.3	13.1	29.4	10.2	8.9	0.886 ⁴	There is a significant shift towards higher values in the contact group.
Monocytes ..	28.614 (10 D.F.) ³	4.9	2.79	5.3	2.76	-0.42	0.1204 ⁵	Higher percentage of low values in the contact group.
Haematocrit percentage	14.035 (12 D.F.)	46.9	2.90	46.7	2.66	0.22	0.208	No significant differentiation.
Mean corpuscular volume	12.095 (9 D.F.)	89.7	8.84	90.3	7.55	-0.62	0.620	No significant differentiation.
Mean corpuscular haemoglobin content	20.124 (12 D.F.)	30.2	3.30	29.9	3.02	0.30	0.235	No significant differentiation.
Mean corpuscular haemoglobin concentration.	13.456 (11 D.F.)	33.6	2.76	33.1	3.09	-48.0	0.214	Slight indication of a shift towards lower values in the control group.
Platelets ..	31.443 (8 D.F.) ³	253.0	105.0	285.0	105.0	-32.2	7.68 ⁴	Contact group shows a significant shift towards lower values relative to the control group.

¹ Homologue group. The results of comparisons of the first group, minus the benzol workers, with the controls, are summarized in this table. The method used is the same as for Table XIX.

² Significant at the 5% level.

³ Significant at the 1% level.

⁴ Significant at the 0.1% level.

⁵ Standard deviation.

⁶ Degrees of freedom.

TABLE XXI.¹

Observation.	Length of Service (Months).										Regression Coefficient.
	0 to 6	7 to 12	13 to 18	19 to 24	25 to 30	31 to 36	37 to 42	43 to 48	49 to 54	55	
Average number of persons:											
Contacts	8	49	54	59	96	101	33	39	49	62	
Controls	81	46	33	15	23	38	22	6	8	13	
Hæmoglobin:											
Contacts	15.8	16.2	16.0	15.9	15.7	16.0	16.2	16.1	16.2	16.3	0.007
Controls	15.0	15.8	16.1	16.0	15.7	15.8	15.6	15.9	15.9	16.0	0.020*
Erythrocytes:											
Contacts	5.2	5.2	5.4	5.2	5.2	5.2	5.2	5.2	5.2	5.3	
Controls	5.2	5.1	5.3	5.4	5.2	5.2	5.1	5.2	5.3	5.2	
Colour index:											
Contacts	1.06	1.07	1.04	1.05	1.06	1.05	1.07	1.05	1.07	1.07	0.0003
Controls	1.01	1.05	1.06	1.04	1.07	1.06	1.06	1.08	1.14	1.06	0.0013*
Leucocytes:											
Contacts	8.8	8.8	9.5	8.8	8.9	8.8	7.7	8.8	8.8	9.1	
Controls	8.6	8.4	8.5	8.0	8.3	8.2	7.9	9.0	7.8	7.2	
Neutrophile leucocytes:											
Contacts	42.0	49.0	49.0	49.0	48.0	48.0	41.0	48.0	45.0	49.0	
Controls	51.0	51.0	49.0	52.0	48.0	48.0	52.0	49.0	45.0	41.0	
Eosinophile leucocytes:											
Contacts	1.3	1.6	2.4	1.7	2.0	1.9	1.8	1.9	1.6	2.1	
Controls	1.9	1.7	2.1	2.6	1.8	1.6	1.6	2.5	2.1	1.9	
Lymphocytes:											
Contacts	43.9	36.4	38.1	37.7	36.8	37.0	34.6	37.6	41.3	38.6	
Controls	31.0	29.4	33.4	23.9	28.9	27.9	26.0	32.0	28.1	27.7	
Monocytes:											
Contacts	5.6	4.5	6.1	5.6	5.2	5.0	4.5	4.3	4.6	4.8	-0.016*
Controls	5.6	5.5	5.3	5.8	5.6	5.4	4.5	5.7	4.5	4.6	-0.018*
Mean corpuscular volume:											
Contacts	90.0	91.0	89.0	91.0	90.0	90.0	90.0	91.0	90.0	91.0	
Controls	89.0	90.0	91.0	87.0	92.0	91.0	92.0	96.0	90.0	90.0	
Platelets:											
Contacts	375.0	247.0	272.0	242.0	230.0	252.0	264.0	261.0	238.0	265.0	
Controls	271.0	289.0	303.0	272.0	319.0	270.0	277.0	304.0	319.0	287.0	
Hæmatocrit percentage:											
Contacts	46.4	47.3	47.3	47.3	46.1	46.7	46.8	47.0	47.0	47.5	0.003
Controls	45.9	46.3	48.0	46.1	46.7	47.2	46.6	49.0	48.1	47.1	0.028*

¹ In Table XXI are summarized the results of investigating the relationship of the figures with length of service in the first and control groups. Table XXI shows the mean value for each factor in the six-monthly length of service groups and the regression coefficient, where significance in either group was attained. This coefficient represents the average increase for each extra month of service. The average length of service is 32.3 months in the contact group, and 20.2 months in the control group, which contains a relatively higher proportion of shorter service personnel. In the case of monocytes the two regression coefficients are significant at the 5% level and approximately equal.

* Significant at the 5% level.

* Significant at the 1% level.

* Significant at the 0.1% level.

an engine cleaning fluid, various paints and thinners, and a rubber solution. The aromatic hydrocarbon content varied from 16% to 56%.

3. An estimation of the aromatic hydrocarbon content of the atmosphere showed variations between 0 and 1400 parts per million. The higher concentrations existed only for short periods, but for the major portion of the time the concentrations were 10 to 35 parts per million.

4. An estimation of the inorganic to organic sulphate ratio in the urine showed ratios all within normal ranges.

5. An investigation of the blood state of the airmen involved was made by red and white cell (total and differential) counts, hæmoglobin and hæmatocrit estimations, calculations of mean corpuscular volume, mean corpuscular hæmoglobin content and mean corpuscular hæmoglobin concentration, and platelet counts. Eighty-seven airmen in contact with benzol, 500 in contact with toluol and other homologues, and 300 controls were examined. Tables and graphs of the results are given for each blood factor.

6. Statistical analysis of the resulting figures revealed in the whole contact group as compared with the control group a slight but significant increase in hæmoglobin value, in the numbers of leucocytes and lymphocytes, and in mean corpuscular hæmoglobin content and concentration, and a slight but significant decrease in the number of platelets. When length of service was considered, it was found that hæmoglobin value, hæmatocrit reading, and colour index all showed a tendency to increase with increase in length of service. Thus, in the contact group we are left with a small significant rise in mean corpuscular hæmoglobin concentration, and in the numbers of leucocytes and lymphocytes, and a small, significant fall in the number of platelets.

7. A table (Table XVIII) comparing our figures for each blood factor, with the standard normal figures given by Whitby and Britton, is included.

8. Our conclusions are given and discussed.

Acknowledgements.

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Reviews.

AGNOSIA, APRAXIA AND APHASIA.

DISTURBANCES of recognition, voluntary actions and speech have always presented many problems to the examining clinician, and in most cases have been relegated to the diagnostic dustbin under the general term of aphasia by all except those specially interested and trained in neurology. The difficulties and absorbing interests associated with a study of their diverse manifestations are thoroughly presented by Dr. J. M. Nielsen¹ in his recently published monumental work on these subjects.

This book is much more than a second edition of its predecessor, which was like a monograph, and it contains full and detailed statements of the evidence on which the author's earlier conclusions were based. The author has also propounded a new nomenclature, which, even if somewhat cumbersome and cluttered up with adjectives, at least has the merit of being based on the anatomy and physiology of speech, reading and writing, and other skilled actions.

After an excellent historical review of observations upon the disturbances under consideration, in which due homage is paid to such famous neurologists of the European and British schools as Broca, Charcot, Marie, Hughlings Jackson and Head, among many others, there follows a chapter in which the author outlines his concepts of egnosia, eupraxia and euphasia, the normal precursors of the pathological states of agnosia, apraxia and aphasia. The psychological, physiological and anatomical aspects of all three conditions are fully explained, and their values in cerebral localization confirmed from conclusions drawn from special cases selected out of the larger number described in detail later on. A plea is entered for the retention of some of the old terms, such as *asembie*, *asymbolie*, *asemasia*, *aphemia* and *avocalia*, but the author states that the three terms already mentioned have become so universal that this is now impracticable. His concepts are, on the whole, well and logically presented so that by the time this chapter has been read and digested, the reader should have clearly crystallized his ideas on the mechanisms of perception and recognition of objects, the accomplishment of purposeful movements, speech, reading and writing, and be ready to absorb the explanations and classifications of the corresponding pathological states described in the next three chapters on the agnosias, apraxias and aphasias, and to understand their localizations, according to the numerical cyto-architectonic areas of Brodmann.

The agnosias are divided broadly into visual (mind blindness) and acoustic varieties, and the apraxias, into kinetic, ideokinetic and ideational types. With the aphasias, the author claims to have been the first to differentiate them into lower and higher levels. The former contain the two major categories of motor and sensory aphasia with their numerous sub-varieties, and are described as "disturbances of recall", that is, reminiscence. They are the opposite concepts to disturbances of recognition. The latter is the hierarchy of semantics (semantic aphasia of Head) and calculations, and involves the powers of comprehension. Next follows a short but very interesting chapter on what the author calls the "Body Scheme", a term used to designate the concept a person has of his own body, its parts and their relations to each other. The clinical features of focal lesions causing defects in this sphere, as they affect either the major (usually left) hemisphere or the minor (usually right) hemisphere, are described clearly, and explain many of the extraordinary localized defects encountered during wartime from bullet and shrapnel penetrating wounds of the brain.

Gerstman's syndrome of "finger agnosia, confusion of right and left sides, acalculia and agraphia" is a particularly fascinating example, even if the name applied to the first portion of the syndrome, namely, visual autotopagnosia, is somewhat alarming; and a difference may exist between loss of recognition for animate as against inanimate objects. Another interesting disturbance of the "body scheme" is described as anosognosia, a denial of one's own hemiplegia usually from a lesion on the minor side; and attention is drawn to the confabulations adopted by some patients to cover up defects of both visual and auditory blindness and deafness.

After a short section on methods of examination, the rest of the book is devoted to a detailed presentation of the case histories and their post-mortem findings, where available, on which the "evidence" for the author's numerous

conclusions is based. Full tribute is given Henschen for having accumulated the world's literature on aphasia and many of his cases are included. This chapter of over 150 pages is really a monumental work in itself and contains descriptions of and conclusions from over 140 cases, chiefly due to vascular lesions resulting in areas of cerebral softening and atrophy, but some cases following neurosurgical ablations of portions of one hemisphere are included.

To select the most important results from such a vast amount of clinical material is impracticable, but much attention has rightly been paid to temporal lobe lesions, especially the conception of a language formulation centre in Brodmann's area 37, lesions of which result in paraphasia and paragrammia. The importance of the major temporal isthmus is stressed (lesions here resulting in absolute jargonaphasia or mutism), and also the external capsule, the so-called quadrilateral space of Marie, through which run many association tracts. The portion of the temporal isthmus which merges with the posterior part of the thalamus is shown to be the seat for attention, and patients with lesions here are very inattentive.

Finally, there is an extensive appendix, which gives an excellent epitome of the whole book together with the author's proposed "physiologic-anatomic" nomenclature. That this is somewhat frightening can be realized from the division of agnosia into "visual parietal numeral agnosia", "visual occipital numeral agnosia", "visual angular literal agnosia" *et cetera*, and the translation of auditory amusia into "auditory semantic temporal musical aphasia" (loss of ability to determine the significance of music, though able to recognize it).

The book itself is attractively printed and well set out on art paper. The illustrations are beautifully produced, clearly annotated and aptly represent their pathological lesions. But it is essentially a work for the advanced student in neurology, and more of theoretical than practical value. Now that cerebral lesions can be so accurately localized by electro-encephalography and pneumo-encephalography there is less and less need for the intricate and lengthy methods of examination and observation by which abnormal neurological localizing signs are determined and analysed.

MEDICAL PRACTICE IN NEW ZEALAND.

DR. DOUGLAS ROBB sets out in his book, "Health Reform in New Zealand", to review the workings of the New Zealand Social Security Act during the five years it has been in operation.¹ The book is chiefly intended for New Zealand readers, but as human nature and political considerations can be assumed to be much the same in Australia as there, his analysis and criticisms of the actual results of the scheme should prove of interest in Australia. Dr. Robb makes it clear that he expresses his own personal views, and in regard to several of the controversial issues involved, these differ from those approved by the British Medical Association in New Zealand.

The author emphasizes that from the outset there was not the free discussion between the Government and the British Medical Association which was essential for the act's success. The Government's conception of the scheme was mainly based on political considerations and the doctors were determined not to accept conditions of service which would place them under bureaucratic control and restrict their freedom of action in professional matters.

Dr. Robb believes in the need for a full medical service freely available to every person in the community and favours a whole-time salaried service, particularly for specialist services for which provision has so far not been directly made.

At its inception, the medical benefits under the New Zealand Social Security Act were to comprise a free general practitioner service together with hospital, maternity and pharmaceutical benefits; to these there have since been added others, such as dental, nursing and laboratory services.

In regard to the remuneration of doctors undertaking service under the scheme the Government first proposed a capitation service, but only 50 doctors out of 800 undertook service on this basis at the rate of 15s. per head *per annum*. A fee-for-service arrangement which was not favoured by the Government as being likely to involve it in unlimited commitments has since become the chief method, and actually has proved to cost very little more than the capitation payment.

¹"Agnosia, Apraxia, Aphasia: Their Value in Cerebral Localization", by J. M. Nielsen, B.S., M.D., F.A.C.P.; Second Edition; 1946. New York, London: Paul B. Hoeber, Inc. 3½" x 6½", pp. 304, with 59 illustrations. Price: \$5.00.

¹"Health Reform in New Zealand", by Douglas Robb; 1947. New Zealand: Whitcombe and Tombs, Limited. 7½" x 4½", pp. 104. Price: 2s. 6d.

Fee-for-service arrangements were introduced in 1941 and operate in three possible ways: (i) The direct claim system—opposed officially by the New Zealand Branch of the British Medical Association, but apparently freely used. The patient signs a form that service has been rendered and the doctor sends the forms each month to the Health Department, receiving 7s. 6d. per service. (ii) The refund system—approved by the New Zealand Branch. The patient pays the doctor his fee—usually 10s. 6d. as formerly—gets a receipt which he takes to the post office and receives a refund of 7s. 6d. (iii) The token system—not approved by the New Zealand Branch and really a modification of the refund system. The patient pays a token fee—usually 3s.—and signs the form as in (i) as well, the doctor collecting as in the direct claim system.

The direct claim and the refund systems are the two chiefly in use.

Salaried whole-time service exists in a few rural areas. Very little has been done in regard to the provision of specialist services beyond providing for a rebate of 7s. 6d. off a specialist's account for each time he has seen the patient.

Regarding hospital benefits, Australian experience agrees with that of New Zealand that these benefits have not resulted in any real benefit either to the patients or to the hospitals. Provision of a cash payment will not provide either the hospitals or the beds which are urgently needed. The number of hospital beds of all kinds continues to be totally inadequate to meet the needs of those requiring admission. The cost of running private and intermediate hospitals has greatly increased—chiefly owing to shorter hours, higher wages and increased costs of commodities and equipment—and these increases more than absorb the hospital benefit. In Australia so far as the public hospitals are concerned the payment to the hospitals of amounts up to three or four shillings a day is conditional on the abolition of a means test and of payments by patients—so the hospitals are no better off. In New Zealand this has also resulted in the cessation of the honorary system of staffing public hospitals, and now the part-time visiting specialist staffs are paid for their services.

Under the pharmaceutical benefit the patient pays nothing. The doctor gives the patient his prescription which he countersigns when he receives his bottle from the chemist. The cost of pharmaceutical benefits has risen steadily and now stands at 13s. 6d. per head *per annum* of the population, while the cost per head of the general medical service is very little more—being approximately 16s. 10d. per head.

The cost of the whole scheme (medical as well as non-medical benefits, such as pensions) has greatly exceeded the original estimates. At the inception the money to meet the costs was to be provided by a social security tax of one shilling in the pound per week on wages and income payable by practically everyone in the community. In 1945-1946, £7,000,000 had to be added from the Consolidated Fund, which works out that a little more than two shillings in the pound would have been required (or £18 12s. per head *per annum*). In the estimate for 1946-1947, however, in spite of increasing the revenue from one shilling to one shilling and sixpence in the pound a sum of £18,000,000 was to be transferred from the Consolidated Fund, equivalent to a contribution of three shillings in the pound. Most persons would agree with Dr. Robb that with the large arrears of hospital construction which must be undertaken in the near future and the steep rise of building costs and of maintenance charges, the fund must be still further increased or benefits curtailed.

An acute shortage of nurses exists in New Zealand as well as elsewhere. Existing hospitals cannot get the staff they need, and this may well be the most important problem to be solved before still further hospitals are built. At one large hospital with an average annual entry of 167 trainees *per annum* there was an average wastage over four years of 87.5—well over 50%. Dr. Robb advocates greater freedom from restrictions—better amenities and more variety of service with "living out" arrangements for many of those who have finished their training. He also suggests a basic training of two years—mainly practical—for what would in effect be nurse assistants, and extended training for those with greater ability and attainments with opportunities for post-graduate work, theatre and laboratory experience, administrative duty *et cetera*. As he points out, these views are not new and are not approved by all nursing authorities.

In his summing up, Dr. Robb states that as the scheme stands at present there is a disproportionate attraction to general practice rather than to specialist, scientific and teaching work, all of which require long and arduous training with less certainty of financial return on its completion.

He believes that for general practice, the group type of practice under public auspices will eventually become

universal, the doctors and nurses being employed by an authority set up for the purpose and paid by basal salary with additions for special service and qualifications. He also thinks that private practice should not be hindered at any stage even if group practice becomes the standard. He would base specialist practice in the general and special hospitals, with out-patient departments and clinics for consultation and investigation.

Dr. Robb feels there is an urgent need for revision of the whole scheme in the interests of economy and effectiveness, and recommends that a commission be set up for the purpose. Although he states at the outset of the book that many of the troubles which arose might have been avoided by free discussion with representatives of the medical profession beforehand, he would not insist on a medical man being a member of such a commission. He suggests instead that interested professional groups should be fully consulted, but one would have thought that medical men with their special knowledge and experience would be best fitted not only to advise but also to have the responsibility of helping to frame the necessary alterations to the scheme. They have shown by their administrative and organization work in the medical services during the war and in large scale civil undertakings that many of them are fully competent to do so.

A TEXTBOOK OF MEDICINE.

WHEN "The Principles and Practice of Medicine" was first published under the authorship of William Osler in 1892, the clarity of the style and the easy convincing language in which it was written won the new textbook such immediate and widespread popularity that it very soon became adopted as a standard student's manual throughout English-speaking medical schools. We have no hesitation in saying that in the latest—sixteenth—edition, now under the authorship of Professor Henry A. Christian, the original high standard has been fully maintained.¹

A happy innovation introduced in the volume is the inclusion in the preparatory matter of a short article showing how the progress of medical knowledge has been reflected in the many changes in the text that have had to be made since the first edition appeared. This very revealing sketch is presented by James G. Carr, of Chicago, under the title "The History of Medicine (1892-1947)" as told in sixteen editions of Osler's "Principles and Practice of Medicine".

Though it is barely three years since the fifteenth edition was reviewed in these pages, so many parts have had to be revised or rewritten that it is very obvious that a textbook abreast of the times in 1944 is well behind them in 1947—a statement, by the way, likely to provoke rather a mournful reflection in those with slender resources who have to purchase these expensive books.

The need for prompt revision particularly applies to a standard work in which, as has been the case in this one since the 1942 edition, references to current literature are appended to the more important articles, for such references largely lose their value unless kept well up to date.

Professor Christian in his preface refers to the great changes in viewpoint that have taken place during the last few years in regard to that large group of disorders included under the heading of infectious disease. This, he points out, has necessitated a good deal of regrouping and alteration of terminology, while treatment has had to be extensively revised, particularly in those infections in which chemotherapeutic remedies have been found to act beneficially. Those familiar with earlier editions of the book will certainly find these chapters greatly altered.

The section dealing with deficiency diseases may be selected for special comment as an admirably balanced, restrained and well-written account of a subject about which unquestionably a great deal of misleading literature of a propagandist nature is being circulated at the present time. After a preface clearly setting out the factual knowledge available about those vitamins known to play definite roles in human metabolism, the chief diseases in which deficiencies of vitamins have been proved to be determining, or at least important, factors are clearly and succinctly described and the dosage and methods of choice in administration of the missing vitamins precisely indicated.

¹"The Principles and Practice of Medicine: Originally Written by William Osler, M.D., F.R.C.P.: Designed for the Use of Practitioners and Students of Medicine", by Henry A. Christian, A.M., M.D., LL.D. (Hon.), Sc.D., Hon. F.R.C.P. (Cantab.), F.A.C.P.: Sixteenth Edition; 1947. New York and London: D. Appleton-Century Company, Incorporated. 9½ x 6", pp. 1580. Price: \$10.00.

The Medical Journal of Australia

SATURDAY, DECEMBER 6, 1947.

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REST.

In a "comic strip" published not so long ago in an Australian newspaper a languid youth was made to remark that "doin' nothin' makes ya tired because ya can't stop and rest". We all like to stop and rest and we have all kinds of reasons for our liking. The chief reason is that we cannot go on indefinitely doing the same thing; after some time, long or short, we find relief in doing something else. This is rest. The subject of rest is important to the doctor; he enjoins it on many of his patients, and he needs it very often just as much as they. From his earliest days of "walking the hospitals" the medical student is taught that rest is a part of treatment; he sees patients put at rest, and if he has understanding he appreciates the good that follows. Some of the older clinical teachers in this country used to recommend their final year students to read, among other books, Hilton's "Lectures on Rest and Pain", and those who followed this advice have always been grateful for it. Hilton described rest as the chief natural therapeutic. In his first lecture he reminded his readers of the Creator's provision that man's fatigue and temporary exhaustion should be followed by "his greatest earthly solace"—"the blessing of rest and repose, by calm and peaceful sleep". He referred to physiological and mechanical rest and he wondered how man would have fared if Nature's powers of the repair of injured tissues had been withheld. He then pictured man's condition when rest was the sole curative means of which he could avail himself. He also mentioned repair and growth, referring to the former as merely a repetition of the latter, and describing rest as the necessary antecedent to the healthy accomplishment of both.

Rest is needed both in sickness and in health; but there is a world of difference. The young adult who is said to be bursting with rude health rests at the end of a day's exertion and is soon ready to repeat his performance; his condition is different, though not perhaps fundamentally, from that of a man who has worked himself to a standstill or who has sustained an injury to a limb and cannot use it. In the one case cessation of

activity will be all that is needed; in the other, rest may have to be prescribed in certain forms and different types of activity may be necessary. There is no difficulty about the provision of rest for the bursting-with-health adolescent; but for over-tired people or injured workers, experience is called for if rest is to be used to the greatest possible advantage and, it must be added, if no harm is to follow its adoption, for rest can be abused as well as used. This has been emphasized recently by Lord Horder in a short paper¹ entitled "The Use and Abuse of Rest". Appropriately this article is the first in a special issue devoted to convalescence. At the outset Lord Horder refers to John Hilton and to Weir Mitchell as two whose names were preeminent in the advocacy of rest as a therapeutic agent. He points out that both these men were subjected to considerable criticism, each in his own day, especially Weir Mitchell, the chief features of whose well remembered treatment were seclusion and rest. Hilton's "gospel" (as Lord Horder calls it) did not carry with it a warning that an inflamed or injured part may be rested for too long a period with results prejudicial to the patient, which themselves call for special treatment. Though Hilton's practice has been modified with the passing of time, his clearly stated principle that rest is a most important therapeutic agent still stands. The original "rest cure" of Weir Mitchell, on the other hand, has passed out of the therapeutic field—the advent of psychiatry has brought a realization that to leave the patient's mind in a state of vacuity or (more correctly and more often) struggling without guidance with the obsession which is the cause of his illness, is to waste a good opportunity for psychotherapy. The old time Weir Mitchell treatment was a first-rate example of the way in which rest could be abused. Discussing the use of rest, Lord Horder points out that Nature can be greatly helped but never hustled. There is no royal road by which rest can be avoided in the treatment of a young person suffering from an inflamed heart or kidney, of a sufferer from early tuberculosis or from tuberculosis of the peritoneum for which surgical treatment is unsuitable. "He who tries to save time will probably lose it, and may lose his patient too." In the treatment of emotional stresses and other forms of mental trouble Lord Horder defines three essentials—a careful study of the individual so as to discover what is rest to him or her, pains to find out how and where the remedy can be dispensed, and the training of the patient in "progressive relaxation". Obviously the individual must be studied, whether the disability is of physical or of mental origin, and Lord Horder makes a telling statement when he declares that "the last thing to assume is that what the doctor would find restful the patient would also". In all this we presume, of course, that the individual concerned is in need of rest; even if he has merely become "stale" at his work, he is due for a rest. In some cases of severe mental exhaustion rest without bodily exertion may be needed, just as it is by a patient recovering from a severe physical illness or disability. Sometimes the rest that is needed is a change of occupation—in the language of a medical man quoted by Hilton, "a rest to the faculty which has been overworked". This is the kind of rest needed by the average man or woman—the medical practitioner, let

¹ The Practitioner, August, 1947.

us say, goes fishing; a clerk, a printer or a builder takes a holiday by the seaside, basking in the sun and swimming; an engineer or other worker in confined spaces goes to the open life of the country; another will lay out or tend a garden, or paint his house, and so on. If the doctor is to be of real help he must pass in review what Lord Horder calls the whole of his patient's domestic economy. He also insists that the patient must be taught how to rest, because this knowledge does not come by instinct.

It is all very well to discuss rest as a part of treatment; what is also needed is to regard it as part of the art of living. Lord Horder mentions training in relaxation as a prophylactic against "nervous breakdown", and he also refers to the value of time spent by the doctor in cultivating in his patient "the hygiene of a quiet mind". He might have gone further and insisted on the maintenance of a balance between work and rest, between tasks that are obligatory and those that have their own peculiar appeal. There are some persons whose work is so congenial to them that it fills their whole lives; these are likely to become stale without knowing it and to become so wound up mentally that the unwinding process is painful. There may be a few, like the youth in the "comic strip", who complain that they are tired from doing nothing and cannot rest. It would be a mistake to leave this subject without some reference to climate, especially since the Commonwealth of Australia can boast of both temperate and tropical areas. We all know that in the tropics "mad dogs and Englishmen go out in the noon-day sun" and that they are said to be none the worse for this "foolish habit". It does seem reasonable to suggest, however, that habits of work and rest might be better adjusted than at present to hot and humid conditions. To pursue this subject further would call for a discussion on the whole art of living. Understanding on this subject is needed today in increasing measure as hours of work are being shortened and leisure is increased. Lord Horder concludes his article with a reference to the thesis of William James that we are happy because we smile, not that we smile because we are happy; in this he sees a psychosomatic truth. He observes that he was once challenged by a patient whom he was trying to reassure by a recital of what was not the matter. The patient asked what was the matter with her. Lord Horder replied: "It's your face; break up that face and you will begin to feel better." The patient did as she was told. Our final conclusion is that if we cultivate the art of living, of work and rest in due and wise proportion, we shall smile and be happy.

Current Comment.

COALMINERS.

THE coalmining industry has had an important place in the recent social and economic history of Britain, not only because of the great economic importance of coal to the country, but also because of the frequent disputes and upsets that have occurred in the industry. Coalminers have their own problems which are little understood by the general community. The British Government has recognized their difficulties by the setting up of the

Miners' Welfare Fund and, for the administration of the fund, a commission whose report was recently discussed in these columns. Any appreciation of the medical problems associated with coalmining demands some knowledge of the miners' social and industrial background. For this reason attention is drawn to a recent discussion of the subject by J. N. Morris,¹ based on the fact that the coal problem today is essentially the problem of the miners. Morris reviews the stormy history of the industry during the past two or three decades, paying particular attention to details in which coalmining has differed from other branches of industry. Changing economic circumstances have brought periods of severe slump in the industry with widespread unemployment and reduced standards. Conflict between colliery owners and miners was frequent (until the industry was nationalized) and Morris suggests that the coalmining industry did not share to any great extent in the progressive improvement of employer-employee relations occurring in other parts of industry from early in this century. The atmosphere in the coalfields has been one of bitterness and this has only served to emphasize the high occupational hazards associated with the industry; statistics quoted for 1933 show that underground workers in coalmines have a far worse record of accident and disease than those in other industries and even the surface workers have a high rate.

In the period between the two wars "a revulsion of feeling has taken place against colliery life and colliery work" with three main results among the miners: conflict with employers, a drift from the mines, and determination that their children's future shall lie elsewhere. The fall in the number of coalminers has been great and has affected particularly the younger people. The decrease in the birth rate among miners' wives of childbearing age has been greater than the general national decrease. Studies of total death rates among miners are misleading, as deaths by accident form a high proportion of causes, but examination of death rates among miners from "natural causes" reveals an unfavourable position in relation to industry generally. Possibly an important factor in these figures is that formerly the miners were recruited largely from the more robust children of mining families, but today many of the young fit men are leaving the industry and a less healthy group is being employed, recruited both from the mining towns and from outside. The whole picture in this inter-war period is an unhappy one. Wages were poor; "most miners, though over half were reckoned as skilled workers and none as unskilled, whether in work or out of it, on full time or short time, could not provide their families with the minimal needs for healthy living". The mortality rates of miners' infants and miners' wives were notably higher than those of other working class groups. The miners themselves had relatively regressive mortality trends, four times their share in compensatable disease and accident, and twice the sickness of other workers. Loss of time through disputes was heavy. All the unsatisfactory features combined to bring about withdrawal from the industry, a state of affairs with much deeper psychological undercurrents than are indicated by the actual movement of individuals away from the coalfields.

After 1939 the urgent demands of war abolished unemployment in the mining areas and precipitated improvements in wages and general conditions of employment. The miners, however, did not respond. The course of a strongly flowing stream could not be reversed overnight and conscription was found necessary, both of ex-miners who had enlisted or gone to other industry and of others outside the industry, the "Bevin boys". The service was unwilling and, with the end of the war, even nationalization, a five-day week and the desperate fuel shortage have brought about only a limited improvement.

Possibly the drastic powers assumed by the British Government since Morris wrote his article will have controlled the manpower problem, but such solutions are

¹ *The Lancet*, September 6, 1947.

only temporary. This sickness needs more than symptomatic treatment. Morris considers that "medicine with its many disciplines could contribute more than it has done in eliminating some of the unattractive features of the industry, and could help to increase the well-being of miners and mining communities. Equally, medicine should be concerned with the larger questions of social health that are raised by this problem". The first need, he states, is for organization. A controlled association of medicine with mining. The inadequate provision of doctors, hospitals and occupational health services obtaining in mining areas before the war must be remedied. Consideration should be given to pre-entry medical examinations which the miners' unions now support. Information is urgently needed on many of the medical aspects of the industry: the nutritional requirements for optimal output; the changing relations of hours, shifts, output, absenteeism and fatigue; the relation of the miner's age to efficiency. Further investigation of morbidity is required. Among occupational diseases pneumokoniosis is receiving attention, but others—the "beat" diseases, "fibrositis", "dermatitis"—call for careful consideration. Nystagmus and accident-proneness warrant not only study but the application of present knowledge. Problems in the field of industrial psychology relate to methods of mine management and especially to mechanization. As Morris states, if there is any truth in the contention that machinery can make a colliery a mechanized hell, it is medicine's business to intervene in good time. The provision of an industrial health service and practical facilities for rehabilitation are required, though these are apparently most desperately needed in South Wales. The matter of rehabilitation has received much positive attention from the Miners' Welfare Commission, but there is need for more practical application of provision already existing for the resettlement of the disabled. Morris brings forward a suggestion previously made that research and teaching on these matters might be centred in a school of mining medicine; the activities of such a school might improve the industry sufficiently to stop the drift of young miners from the coalfields.

On the larger issues of recruitment and the place of the miner in society Morris offers his ideas. He feels that the extension of recruiting to the whole community is a healthy development, but that the offering of material and economic inducements, if followed up wisely, is important. The general "uncivilization" of mining villages requires urgent consideration and a place of high priority in the housing plan. Finally he discusses the miner's social status which has always been low for no reason other than an artificial scale of social values; this has been superficially altered owing to the importance of coal supplies during and since the war, but will handicap the industry and the whole country unless it is dealt with.

Morris's study is comprehensive and contains a good deal of detailed information that will repay careful study. Certain aspects of the situation are peculiar to Britain, but much of what he discusses will apply equally in this country. It will be remembered by those privileged to hear him that the late Professor David Jones, of the University of Birmingham, who visited Australia shortly before his tragic death, spoke in the warmest possible terms of the willingness of miners to cooperate in measures directed to the improvement of working conditions in mines. He had had an enormous experience of miners in many countries and was a world authority on dust in mines and its prevention. He looked on miners as the "salt of the earth". He made a plea for a wider understanding by doctors of lung disease caused by dust and thought that psychological damage was done to miners by the common practice adopted by doctors of sending a miner to be investigated by a medical board instead of examining and treating him individually as they would a worker in other industries. The thought in Morris's article that warrants particular emphasis is that medicine and mining must be associated more closely, and this point of view extends to industry generally. An active interest in industrial medicine and a desire

for progress and reform in the sphere of the industrial worker are not necessarily political, though they are frequently so called; more often the views expressed are just sound medicine. A constructive attitude on these problems by members of the medical profession, individually and collectively, would go far towards giving the profession the place of leadership in the community which it should and could hold.

STREPTOMYCIN IN THE TREATMENT OF URETHRITIS.

PENICILLIN is now accepted as the specific remedy for urethritis due to the gonococcus and also that due to many other organisms. Penicillin-resistant strains do, however, occur, and recently investigations have been made into the use of streptomycin in such cases. A report by Edwin J. Pulaski describes the treatment with streptomycin of nine patients in United States army hospitals who suffered from gonorrhoea that did not respond to penicillin or sulphadiazine.¹ An arbitrary dosage was used of 0.5 gramme administered intramuscularly every three hours for six doses. The symptoms of five patients disappeared rapidly and evidence of cure followed. Three patients had also infection of the prostate; in two cases streptomycin with prostatic massage brought satisfactory results, but the third patient, though clinically improved, was not cured. One patient had chronic epididymitis; all evidence of urethral infection disappeared, but the epididymitis did not respond to streptomycin. Thus in seven of the nine cases the response was satisfactory. Pulaski then describes the treatment of six patients suffering from non-gonococcal urethritis. Two who had uncomplicated urethritis responded rapidly and completely to streptomycin; four who had also prostatitis failed to respond in a satisfactory degree. Four patients with epididymitis derived no benefit from streptomycin therapy.

A larger series of patients suffering from gonorrhoea was treated with streptomycin in Washington by Ben D. Chinn, Lawrence E. Putnam, S. Ross Taggart and Robert P. Herwick.² These patients had received no previous treatment and the question of penicillin resistance was not raised. The object was to assess the response of the infection to streptomycin, especially in regard to dosage. A single injection only was given into the gluteal muscle. Fifty patients who received a single injection of 0.3 gramme or more were cured. Of 22 patients treated with a single injection of 0.2 gramme, 20 were cured; the other two responded to a second injection of 0.2 gramme. Of five patients treated with 0.1 gramme, two were cured; of the other three, two were cured with penicillin and one with a further 0.2 gramme of streptomycin.

There seems no reason to doubt from these reports that urethritis caused by the gonococcus and certain other susceptible organisms is rapidly cured by streptomycin and this apparently in a single appropriate dose given intramuscularly. Satisfactory results do not follow oral administration as a significant concentration in the urine is not obtained. Pulaski states that studies which he has previously made on the prostate failed to reveal the presence of assayable amounts of streptomycin in the gland of patients who had been given the drug parenterally. This would account for the ineffectiveness of streptomycin in controlling prostatitis; the same position presumably holds for epididymitis. However, the effectiveness of the drug as an adjuvant to prostatic massage in the treatment of gonococcal prostatitis requires further consideration. Streptomycin is still too costly and rare (apart from any other considerations) to be substituted for penicillin in the treatment of urethritis; nor is this in the least necessary. Penicillin provides quite efficient therapy, but it seems clear that streptomycin is a useful second string.

¹ *The Journal of Venereal Disease Information*, January, 1947.

² *American Journal of Syphilis, Gonorrhea and Venereal Diseases*, May, 1947.

Abstracts from Medical Literature.

RADIOLOGY.

Aerosinusitis.

JOHN A. COCKE (*American Journal of Roentgenology*, March, 1947) discusses the mechanism of production and the clinical picture of aerosinusitis. The cases are divided into three groups. (i) First degree, where there is only slight pressure differential. Here there is slight transudation of fluid, which releases the block. It is characterized by slight if any pain and usually insufficient symptoms to bring it to the attention of the physician. (ii) Second degree, characterized by swelling of the mucosa and transudation of fluid with pain and hyperæsthesia over the sinus. X-ray examination demonstrates thickened lining and, possibly, fluid. These radiological findings are obviously not specific for aerosinusitis. (iii) Third degree, in which there is extravasation of blood into the sinus cavity or hæmatoma under the mucosa of the sinus. It is this group that is of particular interest to the radiologist, since it is the demonstration of the submucosal hæmatoma that points to aerosinusitis as opposed to other sinus disease. It is emphasized that the characteristic rounded density of the hæmatoma in the frontal sinus may not be seen at the first X-ray examination. This is because the sinus may be full of blood or fluid in the early stage or later inflammatory exudate may be present. Repeated X-ray examination is frequently necessary to establish the diagnosis. In addition, this helps to differentiate hæmatoma from other causes of a rounded shadow in the frontal sinus. The chief differential difficulties lie in polypoid hyperplasia and mucous cysts. Polypoid hyperplasia of this type and appearance is most unusual in the frontal sinus, although very common in the antrum. An allergic history or clinical picture may be helpful in the polypoid conditions, and a history of high altitude flying in the case of hæmatoma. The history of epistaxis or the observation of blood in the nasal cavity points to aerosinusitis. Cysts generally occur in degenerated mucosa. The hæmatoma is made hazy in outline by mucosal œdema in the early stage, and it decreases in size fairly rapidly later, while cysts remain stationary or increase in size over a comparable period of time. Only the severe forms of obstructive aerosinusitis (third degree), accompanied by submucosal hæmatoma, may be recognized as such by the radiologist.

Unilateral Paraspinal Abscess.

EUGENE L. SAENGER (*Radiology*, March, 1947) emphasizes the importance of the linear thoracic paraspinal shadow or postero-mesial pleural line. He draws attention to the occurrence of unilateral displacement of this line, rather than the well-recognized bilateral or fusiform shadow. This postero-mesial line is formed by the mediastinal pleural border of the left lung. In the lower portion of the thorax it lies perpendicular to the central ray on antero-posterior radiograms of the thorax. Normally the line lies immediately adjacent to and parallel to the lateral

border of the thoracic vertebrae and medial to the shadow of the descending aorta. The aortic shadow, however, may be straight, but directed slightly medially as it descends from the aortic knob in younger persons or somewhat convex in its descent in older individuals, with increased tortuosity and uncoiling of the descending aorta. In the lower part of the right side of the thorax, because of the shelving characteristic of the postero-medial aspect of the lung, due to the presence of the azygos vein, the right postero-medial pleural line is usually not seen. It may appear to be continuous with the shadow of the psoas muscle below the diaphragm. Abscess formation has long been a well-recognized finding in tuberculosis of the vertebrae and is most easily demonstrated in the thoracic part of the spine. The normal paravertebral shadow can be displaced in a fusiform manner, that is, bilaterally, by many other disease processes. These include neoplasm of a vertebral body with extension or hemorrhage into the paravertebral soft tissues, pyogenic osteomyelitis of the vertebrae, the acute stage of *vertebra plana*, *osteitis deformans*, and osteochondritis of the spine in infants and adolescents. The appearance of paravertebral abscess may be simulated by rupture of a dissecting aneurysm, by localized pleural thickening, or by localized empyema. The author regards unilateral paraspinal abscess formation as an early manifestation of spinal tuberculosis.

The Pneumoencephalogram of Cerebellar Atrophy.

J. P. MURPHY and ROMAN ARANA (*American Journal of Roentgenology*, May, 1947) state that detailed inspection of the encephalographic appearance of the contents of the posterior fossa is of greatest interest when degenerative disease or maldevelopment of the cerebellum is suspected, and objective confirmation of clinical impressions may be obtained thereby. In addition, air study of the brain, particularly in lateral views with the occipital region of the head superior, can reveal unexpected cerebellar disease. Cerebellar atrophy may appear as enlargement of the *cisterna magna* and fourth ventricle, or as widening and deepening of the interfolial sulci and fissures, or as a combination of these abnormalities. Scalloping and deep fissuring of the surfaces of the hemispheres and nodulation of the vermis are especially evident in cerebellar degeneration of the parenchymatous cortical or olivo-ponto-cerebellar types and in Friedreich's disease. Increase in size of the *cisterna magna* and fourth ventricle as compared with the normal is a feature of cerebellar hypoplasia. This may be related to initiation of the pathological process at the start of the developmental period or to the immature form of the cerebellum in infancy.

Disseminated Granuloma Inguinale of Bones.

W. J. RHINEHART and JOHN T. BAUER (*American Journal of Roentgenology*, May, 1947) state that *granuloma inguinale* is generally considered to be a local disease affecting the mucous membranes and skin of the genital and inguinal regions, but that on occasions it becomes widespread, extending to other parts of the body. Disseminated *granuloma inguinale* is

an uncommon condition, characterized radiologically by osteolytic areas in the long and short bones without visible reaction. There is nothing specific in the radiological findings leading to a diagnosis of *granuloma inguinale*. The lesions in the bones are essentially osteolytic with no reaction in the overlying periosteum, and with no regeneration of bone. Similar lesions are observed in metastatic carcinoma, leucæmia, Hodgkin's disease, lymphosarcoma, multiple myeloma and so forth; so that a diagnosis of *granuloma inguinale* of bones is impossible without clinical history and physical examination, assisted by laboratory studies. The location of the primary lesion, the persistent secondary anaemia and the pronounced constitutional reaction with a continued hectic fever are noteworthy clinical features. Laboratory studies, such as the complement-fixation test, the precipitin test, and tests for cutaneous reactions to antigens derived from cultures of the organism, *Donovania granulomatis*, on the yolks of chick embryo, will probably be of distinct diagnostic value, but, until these have been standardized and are readily available, the final diagnosis rests upon biopsy and the finding of the pathognomonic Donovan bodies and typical phagocytic cells in microscopic preparations.

Accessory Lobe of the Liver.

P. S. FRIEDMAN, L. SOLIS-COHEN and S. LEVINE (*American Journal of Roentgenology*, May, 1947) state that it is not uncommon to visualize radiologically circumscribed soft tissue opacities at the base of the right hemithorax, continuous with the contour of the right hemidiaphragm. It is important to differentiate clinically significant lesions, such as parasternal hernia or tumour of the diaphragm, from protrusion upward of an accessory lobe of the liver. Parasternal hernia is much more common on the right, appearing as a sharply demarcated opacity in the right lower part of the lung field adjacent to the heart. Its density may be uniform if it contains only omentum or fluid-filled intestine. If colon is present within the hernia, haustrations may be visible. X-ray studies following barium meal and enema are essential for recognition. If only omentum is present, there are varying degrees of upward and medial displacement of the right hemidiaphragm, with upward displacement of the stomach. Tumours of the diaphragm are rare, less than twenty cases having been reported. The majority are benign, appearing as lipomata, fibromata and myofibromata. The malignant tumours are fibrosarcomata or fibromyosarcomata. These sarcomata grow rapidly, metastasizing to lungs, pleura and bones. When these tumours are circumscribed they are continuous with the diaphragm in contour and mobility, and can best be demonstrated by induction of a combined pneumothorax and pneumoperitoneum. Accessory lobes from the superior hepatic surface are relatively uncommon. Their recognition is important, since they are clinically benign. They can best be demonstrated by induction of pneumoperitoneum. If an inflammatory mass such as hepatic abscess is causing the protrusion, adhesions are usually present, preventing the entry of air into the subdiaphragmatic space. The frequently observed antero-medial bulge of the right hemidiaphragm probably

represents a variation in contour of the superior hepatic surface. The radiological demonstration of this group of lesions should therefore include the use of fluoroscopy and postero-anterior and lateral radiograms of the chest, examination after barium meal (including small intestinal study), barium enema, and finally induction of pneumoperitoneum.

Eosinophilic Granuloma of Bone in the Hand.

WILLIAM M. LOEHR (*American Journal of Roentgenology*, May, 1947) reports a case of eosinophilic granuloma occurring in three bones (distal phalanx of third finger, distal portion of third metacarpal and distal portion of the radius) of the right hand, although only one of them was giving rise to clinical symptoms. Radiologically the individual lesion of bone presents itself as a small or large radiolucent area. There is nothing characteristic or distinctive about the radiological picture of the individual lesion. The X-ray appearance suggests multiple myeloma, Ewing's tumour or tumour of bone metastatic to the skeleton, or, especially if lesions appear in the skull, it may strongly suggest Schüller-Christian's disease. Keeping in mind the facts that the disease occurs most frequently in children, adolescents and young adults, that it may be single or multiple, that it is multiple there is usually one of the lesions much further advanced and producing genuine clinical symptoms of a local nature only (systemic manifestations being entirely absent as a rule in cases of multiple bone involvement), that when there are symptoms referable to an affected bone local tenderness and pain are the most common, and that if the part affected is rather superficial a local swelling without heat may be palpable, the radiologist can suggest the possibility of eosinophilic granuloma of bone from the X-ray film. The radiological diagnosis can only be suggested as a possibility, since the definite diagnosis can be made only after histopathological study of the tissue obtained from the lesion. It is important, however, to suggest the possibility of this lesion, for it is benign, and solitary lesions which are curetted show gradual repair after this procedure.

PHYSICAL THERAPY.

Carcinoma of the Skin.

CLAYTON H. HALE AND GEORGE W. HOLMES (*Radiology*, June, 1947) describe a study undertaken to find the optimum irradiation dose for carcinomata of the skin. The treatment of 1500 carcinomata of the skin was reviewed. The dose of irradiation given varied from 1200r to 6000r. In 89% of the cases irradiation was given in a single massive dose, while in the remainder it was fractionated over a period of from one to three weeks. Irradiation was given either at 200 kilovolts through a copper filter of 0.25 millimetre thickness or at 100 kilovolts through a half value layer of aluminium of one millimetre thickness. Of the 893 lesions analysed there were 101 failures. The percentage of failures gradually fell as the dose was increased up to approximately 2750r. At that dosage the percentage of failures remained stationary; there appeared to be no

improvement in results following increase of dosage from 2700r to 4000r. There were 26 cases of radionecrosis which developed months to years later. All these occurred in patients who had received a single treatment or a single course of treatment. In twelve the dose had been 3000r or less and only three lesions had received over 4000r. The importance of the size of the lesions is also stressed; ten cases of radionecrosis occurred in lesions one centimetre or less in diameter. With regard to fractionation of dosage, it appeared that 3200r to 3600r must be delivered over a period of one week in order to obtain the same good results as are obtained with 1900r to 2200r in a single treatment; 4500r must be given over a week to equal the results of 2750r in a single treatment. Some failures are due to errors in judgement of the amount of subcutaneous infiltration, occasionally to failure of the patient to remain still during treatment and some to radio-resistance of the tumour. Increase in dosage will not reduce failures from these causes. Among lesions over two centimetres in diameter the percentage of failures was much greater than among those one centimetre or less—probably because of underdosage—as the treatment was in most cases fractionated over one week. All the recurrent lesions over two centimetres in diameter received less than the optimum dosage of 4500r.

Hæmangioma of the Vertebra.

D. BERNARD FOSTER AND GILBERT W. HEUBLEIN (*American Journal of Roentgenology*, May, 1947) discuss a case of epidural hæmangioma associated with vertebral hæmangioma and compression myelopathy, the patient showing an excellent clinical recovery following radiation therapy. It is held that, for those patients in whom the diagnosis of hæmangioma of the vertebra with a slowly advancing myelopathy can be established by clinical and radiological methods, the initial treatment of choice is X-ray therapy. No mortality is associated with the method and only one adverse report, which described the occurrence of acute complete transverse myelitis during the course of irradiation, has been found. It is conceded that acute transverse myelitis occurring in the course of compression myelopathy from vertebral and epidural hæmangioma is best treated by an immediate decompressive laminectomy. It is not felt that the delay of seven to twenty days, which occurs before signs of beginning release of spinal cord compression appear following irradiation, seriously impairs the patient's degree of recovery in the usual type of slowly progressing myelopathy.

Carcinoma of the Tonsil.

JOHN H. WALKER AND MILFORD SCHULTZ (*Radiology*, August, 1947) present a study of ninety cases of carcinoma of the tonsil, in all of which it is reasonably certain that the disease originated at the palatine tonsil, the tonsillar fossa, or the tonsillar pillars or in the triangular fold. Of the patients in the series there were 76 males and 14 females. The average age was sixty-five years. The most frequent presenting symptoms were soreness of the throat (54%), swelling of the neck (46%), difficulty in swallowing, bleeding, loss of weight and hoarseness. Lymph node metastases were often the first indication to the patient of the presence of the disease. When first

seen 60% of patients had lymph node involvement and a further 8% showed involvement later. Histological study of the growths revealed that 78 were epidermoid carcinomata, seven were lymphoepitheliomata, three were transitional cell carcinomata, one was a lymphosarcoma and one a reticulum cell carcinoma. The treatment given to the tumour was in general as much irradiation as the general condition of the patient or the tissues would tolerate. In many instances palliative treatment only was given. Deep X-ray therapy given at either 200 kilovolts or 1000 kilovolts was used. Ordinarily there were two opposing ports supplemented by an intraoral applicator if necessary on the 200 kilovolt apparatus and a single lateral field on the 1000 kilovolt apparatus. Twelve of the ninety patients received in addition interstitial irradiation in conjunction with X-ray therapy. The results with the 1000 kilovolt apparatus were significantly better than those with the 200 kilovolt apparatus. A survey of results of treatment revealed that of those who had no metastases when first seen, 25% survived five years or more, compared with 9% of "five year survivors" in the other group. The total "five year survival" rate was 15%. The subjects of lymphoepithelioma had the highest survival rate. The authors in their discussion refer to other series of cases in which the survival rates of the patients at five years are 10% to 17%, and point out that results have been obtained by irradiation alone, which are almost identical with those following its use combined with surgery or interstitial irradiation. However, surgery may be indicated occasionally, for example, the dissection of neck glands appearing after control of the primary lesion.

Radioactive Phosphorus.

BERTRAM V. A. LOW-BEER (*American Journal of Radiology*, July, 1947) states that β -radiation is particularly suitable for treatment of superficial lesions of the skin because of the low penetrating power. Radioactive phosphorus used on blotting paper can be easily applied to the skin, and the author has a series of cases treated in this manner since 1941. Blotting paper 0.4 millimetre thick and weighing 21 milligrammes per square centimetre is cut to cover the lesion and a safe margin varying from 0.3 to 1.0 centimetre. The blotting paper is backed by adhesive tape and a measured amount of P^{32} solution is soaked into the paper which is then dried before application. The exposure is calculated in microcurie hours per square centimetre. Experiments have shown that a "threshold" erythema is produced by 34 microcurie hours per square centimetre. The lesions treated were basal cell carcinoma, hyperkeratosis, verruca on the hands, plantar and subungual warts and hæmangioma. The results were very satisfactory, especially in the case of plantar warts; 94% of the latter were cured without recurrence. Average doses varied from 5000 microcurie hours per square centimetre with at least 0.5 centimetre of safety margin for warty basal carcinoma to 300 to 600 microcurie hours per square centimetre for hæmangioma. The author stresses the inadequacy of expressing the dose by giving the amount of the radiating source and the time of exposure, but at present this seems to be the least misleading way.

Bibliography of Scientific and Industrial Reports.¹

THE RESULTS OF WAR-TIME RESEARCH.

During the war a great deal of research was carried out under the auspices of the Allied Governments. It has been decided to release for general use a large proportion of the results of this research, together with information taken from former enemy countries as a form of reparations. With this end in view, the United States Department of Commerce, through its Publication Board, is making a weekly issue of abstracts of reports in the form of a "Bibliography of Scientific and Industrial Reports". This bibliography is now being received in Australia, and relevant extracts are reproduced hereunder.

Copies of the original reports may be obtained in two ways: (a) Microfilm or photostat copies may be purchased from the United States through the Council for Scientific and Industrial Research Information Service. Those desiring to avail themselves of this service should send the Australian equivalent of the net quoted United States price to the Council for Scientific and Industrial Research Information Service, 425, St. Kilda Road, Melbourne, S.C.2, and quote the PB number, author's name, and the subject of the abstract. All other charges will be borne by the Council for Scientific and Industrial Research. (b) The reports referenced with an E number may be obtained in approved cases without cost on application to the Secondary Industries Division of the Ministry of Post-War Reconstruction, Wentworth House, 203, Collins Street, Melbourne, C.I. Copies of these are available for reference in public libraries.

Further information on subjects covered in the reports and kindred subjects may be obtained by approaching the Council for Scientific and Industrial Research Information Service, the Secondary Industries Division of the Ministry of Post-War Reconstruction, or the Munitions Supply Laboratories (Technical Information Section), Maribyrnong, Victoria.

PB 20284. HOFFMAN, ARTHUR C., AND MEAD, LEONARD C. The performance of trained subjects on a complex task of four hours' duration. (OSRD Rept. 1701; NDRC Applied Psychology Panel Rept. 29; Project SOS-6, Memo. 1.) July, 1943. 16 pp. Price: Microfilm, 50c.; Photostat, \$2.00.

This project memorandum reports the results of a four-hour experiment in which subjects worked steadily at a complex mental task requiring the continuous matching of dials as well as periodic adjustment of peripheral apparatus. This experiment was planned to test the hypothesis that observers would show signs of fatigue (decrement in efficiency of performance) when continuously engaged for relatively long periods of time in a task of psychological complexity. No significant changes in performance were observed over the four-hour period of the present experiment. Procedures and findings of test are described. A schematic diagram of the apparatus used and graphs are included. This investigation was part of research on fatigue in service jobs carried on at Tufts College under NDRC contract.

PB 47067. BODENSTEIN, DIETRICH. Developmental relations between genital ducts and gonads in *Drosophila*. No date. 11 pp. Price: Microfilm, \$1.00; Photostat, \$1.00.

By transplanting female genital disks into male hosts, attachment to the host testes of oviducts developed from transplanted genital disks is obtained. In these cases the attached testes suffer extensive degeneration. Only cellular contact of the oviducts to the testes brings this phenomenon about. Unattached female ducts do not affect the development of the testis. The principle causing degeneration is not species specific. The findings indicate that the phenomenon encountered is no unique instance, but representative when oviduct and testis establish cellular contact during pupal development. Tables, diagrams, photographs and bibliography are included. This report is a contribution from the Medical Division, Edgewood Arsenal, Maryland. This document may not reproduce well.

PB 47052. MIQUEL, OVIDIO. Action of physostigmine, diisopropyl fluorophosphate and other parasympathomimetic drugs on the rectus muscle of the frog. No date. 9 pp. Price: Microfilm, \$1.00; Photostat, \$1.00.

Influenced by DFP. In muscles treated with DFP the response to acetyl choline was augmented by a subsequent

treatment with physostigmine or neostigmine. Four literature sources are quoted, and one photograph of a drawing is attached.

PB 47051. OLSEN, NORMAN S., AND KLEIN, J. RAYMOND. Effect of cyanide on the concentration of lactate and phosphates in brain. No date. 27 pp. Price: Microfilm, \$1.00; Photostat, \$2.00.

This document is a copy of a manuscript to be submitted to *The Journal of Biological Chemistry*. This study was carried out by the Department of Psychiatry, University of Illinois College of Medicine, Illinois Neuropsychiatric Institute, Chicago, under contract with the Medical Division, Chemical Warfare Service. The effect of intravenous injection of cyanide on the concentration of lactate and certain organic phosphates in brain was studied in paralysed cats maintained with constant artificial respiration. The concentration of lactic acid increases following intravenous administration of subconvulsant, convulsant and fatal doses of cyanide. After administration of the two latter amounts the concentration of phosphocreatine decreases. The changes evoked by the convulsant dose, and presumably the subconvulsant, are reversible. The changes are attributable to direct action of cyanide upon brain. A bibliography of eighteen items is included.

PB 47054. RICHARDS, A. GLENN. A modified interpretation of the chemical organization of arthropod cuticle. No date. 10 pp. Price: Microfilm, \$1.00; Photostat, \$1.00.

This work was carried out in the Division of Entomology and Economic Zoology, University of Minnesota, under contract with the Medical Division, Chemical Warfare Service. Proteins have been shown to be present in high percentage in articular structures whenever proper tests have been made. Chitin is usually but not always present. In development a clearly recognizable protein layer precedes the formation of an underlying protein-chitin layer. Other components (for example, lime) occur only sporadically even though they may be found in several groups. Viewing the arthropod cuticle as a plasticized protein sheet variously modified by additional substances (usually but not always including chitin) allows a unified interpretation of all known manifestations of these cuticles, both internal and external, whereas viewing it as primarily a chitinous sheet does not. A bibliography of 23 items is attached.

PB 47055. ROGERS, PHILIP V. Effect of prepubertal castration and sex hormone injection on the changes in susceptibility of the domestic Norway rat to alpha-naphthyl thiourea. No date. 10 pp. Price: Microfilm, \$1.00; Photostat, \$1.00.

This work was carried out at the Psychobiological Laboratory, Phipps Psychiatric Clinic, Johns Hopkins Hospital, Baltimore, Maryland, under contract with the Chemical Warfare Service. In order to determine whether or not actual pubertal changes are responsible for the decrease in resistance to alpha-naphthyl thiourea observed about the time of puberty, twenty domestic Norway rats were castrated at an early age and given the chemical after reaching an age of 100 days or more. A second group of 29 suckling rats received daily injections of testosterone or theelin and the chemical when they were 35 to 40 days old. It is concluded that the onset of sexual maturity coincides with the decrease in resistance to alpha-naphthyl thiourea, but does not produce it. Four literature sources are quoted.

PB 22933. RIEFFERT, J. B. Tests for selection of personnel in German industry. (Naval Tech. Mission in Europe, Tech. Rept. 300-45.) September, 1945. 54 pp. Price: Microfilm, \$1.00; Photostat, \$4.00.

The German War Department made extensive use of the services of psychologists in the selection of officer personnel and in the selection of individuals to serve as specialists. Psychologists were widely used in industrial organizations for the selection and placement of personnel. This report presents information regarding the tests and techniques employed during the war at the Rheinfell-Borsig plant by Dr. J. B. Rieffert, chief psychologist. The tests are described briefly. The major portion of the report is the appendix, consisting of a brief report by Dr. Rieffert on his testing programme, accompanied by the tests used. These include: directions test; reading comprehension test; analogies test; clerical proof-reading test; spatial relations test; test of planning ability; mechanical insight tests; two-hand steadiness test. An individual report card for test and foreman's rating card for tests are also included. These and the tests are given in German as well as in translation.

PB 34831. ROSENTHAL, H. J., TR. The small reaction apparatus (*Das Kleinreaktionsgerät*). (AAF T-2 Translation 752.) June, 1946. 8 pp. Price: Microfilm, \$1.00; Photostat, \$1.00. (Limited supply mimeograph, 25c.)

This translation presents a description of the subject apparatus and of the testing procedure. The purpose of this apparatus is to make it possible to test the power of concentration and capacity of reaction during the selection

¹Supplied by the Information Service of the Council for Scientific and Industrial Research.

of pilots, radio operators, range-finder operators, submarine sound locators *et cetera*. Operating instructions and table are included. Diagram showing plug connexions for headphones and foot switch is also included.

PB 50946. FRIEDENFELD, HANS, TR. Gas injuries: Effect of chemical warfare agents and other toxic agents upon man, and the treatment of the injuries caused by them. (Partial translation of German pamphlet.) (CWS 43rd Chemical Lab. Co. Captured Material Tech. Rept. 6.) October, 1943. 8 pp. Price: Microfilm, \$1.00; Photostat, \$1.00.

The partial translation was concerned only with the so-called "new gases" listed in the pamphlet. Only trichloroethylamine (HN_3) and phosgene oxime ($\text{Cl}_2\text{C}=\text{NOH}$) were considered as such. Physical properties, physiological effect, and treatment of the two compounds are described in this report.

PB 56214. MATSUDA, KOJIRO. Micromethod of determining the volume of hemoglobin in the human blood. No date. 4 pp. Price: Microfilm, \$1.00; Enlargement Print, \$1.50.

Determination of the volume of hemoglobin in the human blood by a simple method of utilizing a small amount of blood (0.05 millilitre). Study of the effect of nutrition and various exercises on hemoglobin. In Japanese. Abstract prepared at Headquarters Air Material Command, Wright Field, Dayton, Ohio.

PB 48420. SWANGARD, W. MICHAEL. Unipolar ionized air: Apparatus and application. (FIAT Final Rept. 899.) September, 1946. 25 pp. Price: Microfilm, \$1.00; Photostat, \$2.00.

This report describes the construction of an apparatus to produce unipolar ionized air. The apparatus was designed and built in the Department for Physical Therapy at the University of Frankfurt Medical School, Frankfurt am Main. Clinical data as available were obtained regarding inhalation treatments for asthma and other conditions of the upper respiratory tract. The main person interviewed was H. Lampert. Photographs, diagrams, graphs and bibliography are included.

PB 51043. U.S. ARMY TECHNICAL INTELLIGENCE CENTRE, MEDICAL ANALYSIS SECTION, TOKYO. Needle, hypodermic, with hard rubber base. (Rept. 160.) January, 1946. 2 pp. Price: Microfilm, \$1.00; Photostat, \$1.00.

The only unusual feature of this item is the fact that the base of the needle is made of a hard-rubber compound instead of metal. It seems doubtful that this item could withstand repeated sterilization. Photograph.

PB 56044. ZEISS, CARL JENA. Fundamental physical data of the human eye (*Das menschliche Auge—Die wichtigsten Zahlen*). May, 1941. 13 pp. Price: Microfilm, \$1.00; Enlargement Print, \$1.50.

Construction as well as physiological properties of the human eye such as adaptation, accommodation, contrast sensitivity *et cetera* are explained in physical terms and fundamental figures. Abstract prepared at Headquarters Air Material Command, Wright Field, Dayton, Ohio.

PB M 19989. BRITISH INTELLIGENCE OBJECTIVES SUBCOMMITTEE. Interrogation of Professor V. Studnitz. (Interrogation Rept. 55.) July, 1946. 1 pp. Price: Microfilm, \$1.00; Photostat, \$1.00.

Dr. von Studnitz, Professor of Zoology at Halle, has specialized in physiological optics. In 1932 he isolated the substance responsible for the photosensitivity of the cones, and in 1940 he separated this substance chromatographically into the three constituents responsible respectively for red, blue-green and yellow sensitivity. He claimed that a dichromat could acquire three-colour vision by taking the appropriate constituent. Absorption curves of vision in deep red and near infra-red show an increase in absorption in the case of the near infra-red with the wave-length at 750 millimicrons suggesting a peak somewhere beyond 800 millimicrons. Subjective measurements of the brightness of a field at 750 millimicrons against that of a comparison field at a shorter wave-length in the red showed that the brightness sensation of 750 millimicrons increased with a pre-adaptation of two to five minutes in red light. The effect normally lasted only a minute or two, but its persistence could be increased to about ten minutes by a three times normal dosage of ascorbic acid.

PB A 44491. CHANUTIN, ALFRED, AND LUDEWIG, STEPHAN. The effect of β -chloroethyl vesicants, thermal injury, and turpentine on liver function. No date. 27 pp. Price: Microfilm, \$1.00; Photostat, \$2.00.

This work was done at the Biochemical Laboratory, University of Virginia, under contract with CWS. Plasma fibrin and cholesterol of dogs were determined after (a) exposing the skin to liquid bis (β -chloroethyl) sulphide; (b) the intravenous injection of bis (β -chloroethyl) sulphide (the sulphur mustard gas) and the hydrochlorides of ethyl bis (β -chloroethyl) amine methyl bis (β -chloroethyl), amine, and tris (β -chloroethyl) amine (the nitrogen mustard gases); (c) subcutaneous and intradermal injection of turpentine; and (d) thermal injury. The plasma cholesterol

and sugar concentrations of rats were elevated after intravenous injection of chloroethyl vesicants. The changes in the concentrations of blood and liver constituents indicate that liver function is stimulated after injury. Ten graphs and a bibliography of nine items are attached.

PB M 44490. ELLIS, SYDNEY, AND BODANSKY, OSCAR. The effect of diisopropyl fluorophosphate (DFP) on the Q_{10} of the rabbit cerebral cortex. No date. 6 pp. Price: Microfilm, \$1.00; Photostat, \$1.00.

This work was carried out at the Biochemistry Section, Medical Division, Chemical Warfare Service, Edgewood Arsenal, Maryland. It was considered of interest to determine whether brain oxygen uptake is modified by diisopropyl fluorophosphate, which is of potential value in the treatment of *myasthenia gravis* and glaucoma, when the brain cholinesterase is markedly inhibited. It was found that DFP has no appreciable effect on the oxygen uptake of cerebral cortex slices of rabbits injected with this compound as compared with that of untreated animals even though the brain cholinesterase activity is practically completely inhibited. A bibliography of eleven items is attached.

PB A 45886. HOMBURGER, E., *et alii*. Some factors affecting the susceptibility of rats to various barbiturates: Effect of age and sex. No date. 12 pp. Price: Microfilm, \$1.00; Photostat, \$1.00.

This study was carried out under the auspices of the Department of Physiology and Pharmacology and Anaesthesia, Albany Medical College, Albany, New York, and the Medical Division, Army Chemical Corps, Edgewood Arsenal. Three different strains of rats were employed. The newborn rat is more susceptible than is the adult. Rats weighing 50 to 200 grammes are less susceptible than those weighing 201 to 500 grammes. Female rats are more susceptible than male rats. The following substances were used for the experiments: pentobarbital, γ -methyl pentobarbital ("compound 897") and pentothal. A bibliography is attached.

PB M 58387. U.S. WAR DEPARTMENT. Electro-surgical unit, portable. (Tech. Manual 8-616.) August, 1944. 27 pp. Available from the Supt. of Docs., Washington 25, D.C. 10c.

This electro-surgical unit, Medical Department item number 36703, is a standard type electrical surgical unit with two high-frequency oscillating currents combined in a single housing. One current generated is a cutting current, the other is a highly damped wave form for coagulation. A single selector switch permits instant change from cutting to coagulating current without release of electrode in hand. A foot switch, 3R01656, completes the control system. The unit is mounted in a compact, portable case with a compartment in the cover of accessories. This manual is concerned chiefly with assembling, operation, maintenance and packing of the unit manufactured by Liebel-Florsheim Company, Cincinnati, Ohio. A standard nomenclature list of parts is appended. Illustrations show the component parts and accessories.

PB L 58390. U.S. WAR DEPARTMENT. Field sterilizing equipment. (Tech. Manual 8-622.) November, 1944. 109 pp. Available from the Supt. of Docs., Washington 25, D.C. 20c.

This manual contains information on the operation and for first and second echelon maintenance of the following field sterilizing equipment: autoclave laboratory, horizontal, leaded gasoline (item number 4011028); complete hospital sterilizer, steam (item number 7910005); horizontal dressing and utensil sterilizer (item number 9950000); and instrument sterilizers as follows: 20-inch (item number 9952300), 14-inch (item number 9953000), 12-inch with gasoline burner (item number 9953528), and 9 $\frac{1}{2}$ -inch with gasoline burner (item number 9954028). Medical Department item numbers are given. Besides the introduction which describes the various sterilizers and lists their manufacturers, there is an appendix which includes instructions for shipment and storage and a list of all service parts. Sterilizers subject bacteria-laden articles and solutions to moist heat of approximately 250° F. or boiling water until free from germs. The laboratory autoclave consists of a horizontal cylindrical pressure chamber with a pressure sealing, roll-in-place door. It is a self-contained unit using a military burner and a boiler attached to the stand for steam generation. The complete sterilizer consists of a dressing and a water sterilizer of the pressure type and a utensil and an instrument sterilizer of the non-pressure type. The instrument sterilizers are non-pressure type and consist of military burners and covered boilers in which instruments can be submerged in boiling water. Portable steam boiler for sterilizers (item number 9910000) is designed for use as an auxiliary source of steam supply in those units not using gasoline burners. The horizontal dressing and utensil sterilizer is a self-contained unit with a steam jacket about the pressure chamber serving as the boiler which is heated by a gasoline burner. Manual is illustrated by photographs and drawings.

British Medical Association News.

VICTORIAN BRANCH NEWS.

THE following books have been added to the library of the Medical Society of Victoria (the Victorian Branch of the British Medical Association). For the convenience of those recently discharged from the forces, the additions made in 1945, which were included in the last published list, have been incorporated.

Agriculture.—C. A. Baker, "The Labouring Earth", 1942; Sir Albert Howard, "An Agricultural Testament", 1944.

Allergy.—S. L. Feinberg, "Allergy in Practice", 1944.

Anæsthesia.—S. C. Cullen, "Anæsthesia in General Practice", 1946; B. Duncum, "Development of Inhalation Anæsthesia", 1947; Kaye, Orton and Renton, "Anæsthetic Methods", 1946; J. S. Lundy, "Clinical Anæsthesia", 1942; Macintosh and Mushin, "Local Anæsthesia", "Brachial Plexus", 1944, and "Physics for the Anæsthetist", 1946; J. Ross Mackenzie, "Practical Anæsthetics", 1944; S. Rowbotham, "Anæsthesia in Operations for Goitre", 1945.

Anatomy and Histology.—C. L. Callander, "Surgical Anatomy", Second Edition, 1943; E. B. Jamieson, "Illustrations of Regional Anatomy", Sections 1-7, Fifth Edition, 1944; F. Wood Jones, "The Foot: Structure and Function", 1944; Kronfeld and Polyak, "The Human Eye in Anatomical Transparencies", 1945; A. L. McGregor, "Synopsis of Surgical Anatomy", Sixth Edition, 1946; R. F. Ogilvie, "Pathological Histology", Second Edition, 1943; S. L. Polyak, "The Human Ear in Anatomical Transparencies", 1947; S. W. Ranson, "Anatomy of the Nervous System", Eighth Edition, 1947; Jas. Whillis, "Elementary Anatomy and Physiology", Second Edition, 1944.

Bacteriology.—R. R. Kudd, "Manual of Human Protozoa", 1944; L. E. H. Whitby, "Medical Bacteriology", Fourth Edition, 1944.

Biochemistry and Physics.—Hawk, Oser and Summerson, "Practical Physiological Chemistry", Twelfth Edition, 1947; E. J. King, "Micro-analysis in Medical Biochemistry", 1946; I. Maxwell, "Clinical Biochemistry", Sixth Edition, 1947; T. Watson, "Principles and Practice of Physics", Volumes I and II, 1871.

Biography and General Reading.—R. S. Allison, "Sea Diseases", 1943; Bailey and Bishop, "Notable Names in Medicine and Surgery", 1946; E. S. Ellis, "Ancient Anodynes", 1946; A. Fidler, "Whither Medicine, Dogma or Science", 1946; F. Foster, "Comrades in Bondage", 1946; Professor Hayek, "Road to Serfdom", 1945; A. E. Hertzler, "Ventures in Science of a Country Surgeon", 1944; F. Wood Jones, "Habit and Heritage" and "Design and Purpose"; F. H. Martin, "The Joy of Living", Volumes I and II, 1933; H. Moran, "Viewless Winds", 1939; A. Regil, "The Mayos: Pioneers in Medicine", 1942; Bruce Robinson, "Record of Service", 1944; M. Thorek, "A Surgeon's World", 1943; Paul White, "Doctor of Tanganyika", 1941; A. E. Williams, "Barnado of Stepmey", 1943.

Cardiology.—James B. Herrick, "A Short History of Cardiology", 1942; S. A. Levine, "Clinical Heart Disease", Third Edition, 1945; A. M. Master, "The Electrocardiogram and X-Ray Configuration of the Heart", Second Edition, 1942; Hugo Roesler, "Clinical Roentgenology of the Cardiovascular System", 1943; L. H. Sigler, "The Electrocardiogram", 1944; W. D. Stroud, "Diagnosis and Treatment of Cardio-vascular Disease" (two volumes), Third Edition, 1945; Paul White, "Heart Disease", Third Edition, 1947.

Circulatory System.—Allen, Barker and Hines, "Peripheral Vascular Diseases", 1946; D. Harley, "Medico-legal Blood Group Determination", 1943; R. F. Herndon, "An Introduction to Essential Hypertension", 1946; Piney and Hamilton, "Sternal Puncture", 1943; Piney and Wyard, "Clinical Atlas of Blood Diseases", Sixth Edition, 1945; Page and Corcoran, "Arterial Hypertension", 1945; Whitby and Britton, "Disorders of the Blood", Fifth Edition, 1946; M. M. Wintrobe, "Clinical Hematology", Second Edition, 1946.

Dentistry.—Marzell and Max Bronner, "The Dental Surgeon's Handbook", 1944; J. C. Ross, "Essentials of Surgery for Dental Students", 1945; W. J. Tuckfield, "Full Denture Technique", 1944.

Dermatology.—Morris Fishbein, "Medical Uses of Soap", 1945; Percival and Walker, "Introduction to Dermatology", Eleventh Edition, 1947; J. H. Sequeira, "Diseases of the Skin", Fifth Edition, 1947.

Diabetes.—Collens and Boas, "Diabetes Mellitus", 1946; H. J. John, "Diabetes", 1946; R. D. Lawrence, "The Diabetic ABC", Ninth Edition, 1946.

Endocrinology.—L. R. Broster, "Endocrine Man", 1944; A. T. Cameron, "Recent Advances in Endocrinology", Fifth Edition, 1945; J. Hoffman, "Female Endocrinology", 1944; Le Marquand and Tozer, "Endocrine Disorders in Childhood and Adolescence", 1943.

Fractures and Orthopædic Surgery.—J. R. Armstrong, "Bone-grafting in the Treatment of Fractures", 1945; J. G. Bonnin, "A Complete Outline of Fractures", 1941; Key and Conwell, "Management of Fractures, Dislocations and Sprains", Fourth Edition, 1946; L. S. Michaelis, "Anatomical Atlas of Orthopædic Operations", 1946; A. Naylor, "Fractures and Orthopædic Surgery for Nurses and Masseuses", 1944; A. Steindler, "Traumatic Deformities and Disabilities of the Upper Extremities", 1946; Surgical Clinics of North America, "Symposium on Fractures and Dislocations", 1945; James E. M. Thomson (Editor), "The American Academy of Orthopædic Surgeons: Lectures on Reconstruction Surgery", 1944; R. Watson-Jones, "Fractures and Joint Injuries", Third Edition, 1946.

Gastro-Enterology.—W. C. Alvarez, "Nervousness, Indigestion and Pain", 1943; B. P. Babkin, "Secretory Mechanism of the Digestive Glands", 1944; H. L. Bockus, "Gastro-enterology" (three volumes), 1946; Held and Goldbloom, "Peptic Ulcer", 1946; R. Nissen, "Duodenal and Jejunal Peptic Ulcer", 1945; M. E. Rehfuess, "Indigestion: Its Diagnosis and Management", 1943; A. Rendle Short, "Causation of Appendicitis", 1946; Samuel Weiss, "Clinical Lectures on the Gallbladder and Bile Ducts", 1944; Stewart Wolf and H. S. Wolf, "Human Gastric Function", 1943.

Genetics.—J. B. S. Haldane, "New Paths in Genetics", 1941.

Genito-Urinary System.—Edward Weiss, "Practical Talks on Kidney Disease", 1936.

Industrial Medicine and Workers' Compensation.—Jas. Burnet, "Outlines of Industrial Medicine and Hygiene", 1943; W. M. Gafafer (Editor), "Manual of Industrial Hygiene", 1943; H. H. Jordan, "Workers' Compensation and the Physician", 1941; E. D. McBride, "Disability Evaluation", Second Edition, 1938; National Tuberculosis Association, New York, "Industry, Tuberculosis, Silicosis and Compensation", 1945; F. J. Wampler (Editor), "Industrial Medicine", 1943.

Infectious Diseases and Parasitology.—D. L. Belding, "Textbook of Clinical Parasitology", 1942; F. M. Burnet, "Background of Infectious Diseases in Man", 1945; Cox and Tolhurst, "Human Torulosis", 1946; Rogers and Muir, "Leprosy", Second Edition, 1940; J. M. Watson, "Aids to Fever for Nurses", 1945.

Internal Medicine.—J. Murray Steele (Editor), "Advances in Internal Medicine", Volume I, 1942; R. A. Stern, "Trauma in Internal Disease", 1945.

Materia Medica, Pharmacology.—Sir Alexander Fleming, "Penicillin", 1946; G. G. Lewis (compiler), "The Ophthalmic Formulary", 1942; N. Sapeika, "Actions and Uses of Drugs", 1943; F. C. Smith, "Sulfonamide Therapy in Medical Practice", 1944.

Medical Jurisprudence.—J. Glaister, "Medical Jurisprudence and Toxicology", Seventh Edition, 1942; D. Harley, "Medico-legal Blood Group Determination", 1943; H. Kitchin, "Law for the Medical Practitioner", 1944; W. F. Rhodes, "Medical Jurisprudence", 1945; Sydney Smith, "Forensic Medicine", Eighth Edition, 1945.

Medicine.—Beaumont and Dodds, "Recent Advances in Medicine", Eleventh Edition, 1944; R. L. Cecil, "Textbook of Medicine", Seventh Edition, 1947; Clendening and Hashinger, "Methods of Diagnosis", 1947; J. J. Conybeare, "A Textbook of Medicine", Sixth and Seventh Editions, 1942 and 1945; Coppleston and Miller, "Clinical Handbook for Residents, Nurses and Students", 1936; M. Critchley, "Shipwreck Survivors", 1943; D. M. Dunlop, "A Textbook of Medical Treatment", Fourth Edition, 1946; French and Outhwaite, "An Index of Differential Diagnosis of Main Symptoms", Sixth Edition, 1945; I. Harris, "Studies on Hypertony", 1946; Sir A. Hurst, "Medical Diseases of War", 1940; Sir R. Hutchinson, "Elements in Medical Treatment", Fourth Edition, 1945; C. M. MacBryde, "Signs and Symptoms", 1947; R. H. Major, "Classic Descriptions of Disease", 1945; Mayo Clinic and Foundation, "Collected Papers", 1944, 1945; "Medical Annual", 1946; Sir Wm. Osler, "Principles and Practice of Medicine", 1905; R. L. Pullen (Editor), "Medical Diagnosis", 1944; H. Richardson, "Patients Have Families", 1945; "Rypins' Medical Licensure Examinations", 1945; E. J. Steigltz (Editor), "Geriatric Medicine", 1943.

Miscellaneous.—F. C. Eve, "Artificial Respiration Explained", 1945; L. Oakes, "Illustrations of Bandaging and First Aid", 1944; O. Saphir, "Autopsy, Diagnosis and Technic", Second Edition, 1946; R. P. Sloan, "Hospital Colour and Decoration", 1944; R. B. Kelley, "Principles and Methods of Animal Breeding", 1946.

Neurology and Psychiatry.—Ruth Bochner, "The Clinical Application of the Rorschach Test", 1942; Agatha Bowley, "Problems of Family Life", 1946; Brain and Strauss, "Recent Advances in Neurology", Fifth Edition, 1945; Curran and Guttman, "Psychological Medicine", Second Edition, 1945; B. Dattner, "The Management of Neuro-syphilis", 1944; Helene Deutsch, "Psychology of Women", Volumes I and II, 1945; C. W. Heath, "What People Are", 1945; Ironside and Batchelor, "Aviation Neuro-psychiatry", 1945; Jackson and Todd, "Child Treatment and Therapy of Play", 1946; J. W. Klapman, "Group Psychotherapy", 1946; R. M. Lindner, "Rebel Without a Cause", 1944; Alan Moncrieff, "Psychology in General Practice", 1945; T. V. Moore, "Personal Mental Hygiene", 1944; J. N. Nielsen, "Agnosia, Apraxia, Aphasia", Second Edition, 1946; André Ombredane, "L'inhibition et la facilitation dans le système nerveux central et périphérique"; Sir Jas. Purves-Stewart, "Diagnosis of Nervous Diseases", Ninth Edition, 1947; J. C. Raven, "Controlled Projection", 1944; E. A. Spiegel and I. Sinner, "Neurology of Eye, Ear, Nose and Throat", 1944; A. F. Tredgold, "Manual of Psychological Medicine", 1943; F. M. R. Walshe, "Diseases of Nervous System", Eighth Edition, 1947; Weiss and English, "Psychosomatic Medicine", 1943; S. A. Kinnier Wilson, "Neurology", Volumes I and II, 1944.

Nutrition.—A. J. Carlson, "Control of Hunger in Health and Disease", 1916; V. L. Collins, "Infant Feeding", Fourth Edition, 1946; L. E. Holt, junior, "Care and Feeding of Children", 1943; McCance and Widdowson (Medical Research Council), "Chemical Composition of Foods", 1946; J. S. McLester, "Nutrition and Diet in Health and Disease", 1944; G. Dow Scott, "Heredity, Food and Environment in the Nutrition of Infants and Children", 1942.

Obstetrics and Gynecology.—Bourne and Williams, "Recent Advances in Obstetrics and Gynecology", Sixth Edition, 1945; A. W. Bourne, "Midwifery for Nurses", 1944; F. J. Browne, "Ante-natal and Post-natal Care", Fifth and Sixth Editions, 1944 and 1946; Crossen and Crossen, "Diseases of Women", Ninth Edition, 1941; M. Crosse, "The Premature Baby", 1945; A. H. Curtis, "Textbook of Gynecology", Fourth Edition, 1944; W. J. Dieckmann, "Toxemias of Pregnancy", 1941; DeLee and Greenhill, "Principles and Practice of Obstetrics", Ninth Edition, 1947; Wm. Mengert, "Post-graduate Obstetrics", 1947; Emil Novak, "Gynecological and Obstetrical Pathology", Second Edition, 1947; J. H. Peel, "Textbook of Gynecology", Second Edition, 1946; W. Shaw, "Textbook of Gynecology", Fourth Edition, 1945; Minnie Randall, "Training for Childbirth", Third Edition, 1943; J. St. G. Wilson, "Pre-natal and Post-natal Management", 1937; Woodward and Gardner, "Obstetric Management and Nursing", 1944.

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Oto-Rhino-Laryngology.—A. R. Hollender, "Office Treatment of Ear, Nose and Throat", 1943; Jackson and Jackson, "Diseases of Ear, Nose and Throat", 1946.

Pathology.—Beattie and Dickson, "Textbook of Pathology", Fourth Edition, 1943; Wm. Boyd, "Surgical Pathology", Fifth and Sixth Editions, 1942 and 1947; S. C. Dyke, "Recent Advances in Clinical Pathology", 1947; W. D. Forbes, "Reaction to Injury", 1943; R. Muir, "Textbook of Pathology", Fifth Edition, 1941.

Pediatrics.—A. H. Bowley, "Natural Development of the Child", Second Edition, 1943; Marion E. Breckenridge and E. L. Vincent, "Child Development", 1943; W. C. Davison, "The Complete Pediatrician", Fourth Edition, 1943; A. G. deSanctis (Editor), "Advances in Pediatrics", Volume I, 1942; S. Z. Levine *et alii*, "Advances in Pediatrics", Volume II, 1947; Litchfield and Dembo, "Therapeutics of Infancy and Childhood" (four volumes), 1945.

Physical Medicine and Rehabilitation.—Doherty and Runes, "Rehabilitation of the War Injured", 1943; Mary V. Lane, "Massage and Medical Gymnastics", Third Edition, 1945; J. B. Mennell, "Backache", 1935, "Physical Treatment by Movement and Massage", Fifth Edition, 1945; Sir H. Rolleston (Editor), "Practitioner Booklet: After-Care and Rehabilitation", 1943; O. F. G. Smith, "Rehabilitation, Re-education and Remedial Exercises", 1943.

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Radiology.—A. J. Amor, "X-Ray Atlas of Silicosis", Second Edition, 1943; V. W. Archer, "Osseous System: Handbook of Roentgen Diagnosis", 1945; J. Caffey, "Pediatric X-Ray Diagnosis", 1945; A. de Lorimer, "The Arthropathies: Handbook of Roentgen Diagnosis", 1943; J. T. Farrell, junior, "Roentgen Diagnosis of Diseases of Gastro-intestinal Tract", 1946; G. W. Files, "Radiographic Technique", 1944; Hodges, Lampe and Holt, "Radiology for Medical Students", 1947; J. A. Ross, "Handbook of Radiography", Second Edition, 1946; Hugo Roesler, "Clinical Roentgenology of the Cardio-vascular System", 1943.

Respiratory System.—Milton B. Rosenblatt, "Bronchiectasis", 1943; L. Unger, "Bronchial Asthma", 1945.

Surgery.—Hamilton Bailey, "Demonstrations of Operative Surgery for Nurses", 1945, "Demonstrations of Physical Signs in Clinical Surgery", Fourth and Tenth Editions, 1944 and 1946; Hamilton Bailey (Editor), "Pye's Surgical Handicraft", Fourteenth Edition, 1944; Bailey and Love, "A Short Practice of Surgery", Seventh Edition, 1946; W. Boyd, "Surgical Pathology", Sixth Edition, 1947; H. Burrows, "Surgical Instruments and Appliances Used in Operations", Eleventh Edition, 1942; A. J. Cantor, "Ambulatory Proctology", 1945; C. W. Cutler, "The Hand and its Disabilities and Diseases", 1942; Sir H. Devine, "Surgery of the Alimentary Tract", 1940; R. M. Handfield-Jones, "Surgery of the Hand", Second Edition, 1946; A. K. Henry, "Extensile Exposure Applied to Limb Surgery", 1945; D. J. Lefthausser, "Early Ambulation", 1946; R. J. McN. Love, "Minor Surgery", 1944; Mason and Zintel, "Pre-operative and Post-operative Treatment", 1946; D. N. Matthews, "The Surgery of Repair", 1943; Mitchiner and Whyte, "A Pocket Surgery", 1946; Muriel Morley, "Cleft Palate and Speech", 1945; National Research Council, "Military Surgical Manuals", Volumes I to VI, 1942; R. M. Nesbit, "Transurethral Prostatectomy", 1943; Thos. G. Orr, "Operations of General Surgery", 1945; C. A. Pannett, "Surgery: Textbook for Students", 1944; G. E. Parker, "Surgery of Abdominal Trauma", 1944; J. L. Splavack, "Surgical Technic of Abdominal Operations", Fourth Edition revised, 1946; M. Thorek, "Surgical Errors and Safeguards", Fourth Edition, 1943; G. Grey Turner (Editor), "Carson's Modern Operative Surgery", Volumes I and II, Third Edition, 1943; E. Vasconcelos, "Modern Methods of Amputation", 1945.

Tuberculosis.—R. Aitken, "Problem of Lupus Vulgaris", 1945; G. S. Erwin, "A Guide for the Tuberculosis Patient", 1944; Keers and Rigden, "Pulmonary Tuberculosis", 1945; Jas. Maxwell, "Care of Tuberculosis in the Home", 1943; M. C. Myerson, "Textbook of Tuberculosis of the Ear, Nose and Throat", 1944; T. N. Rafferty, "Artificial Pneumothorax in Pulmonary Tuberculosis", 1944.

Veneral Disease.—B. Dattner, "The Management of Neurosyphilis", 1944; J. E. Moore, "Modern Treatment of Syphilis", Second Edition, 1941; A. E. W. McLachlan, "Handbook of Diagnosis and Treatment of Venereal Disease", 1945.

The following is a list of journals *et cetera* currently received by the library.

Abstracts of World Medicine, Abstracts of World Surgery, Obstetrics and Gynecology, Acta Radiologica, American Heart Journal, The American Journal of Digestive Diseases and Nutrition, American Journal of Diseases of Children, American Journal of Obstetrics and Gynecology, American Journal of Ophthalmology, The American Journal of Psychiatry, American Journal of Public Health and The Nation's Health, American Journal of Roentgenology, The American Journal of Surgery, The American Journal of Tropical Medicine, American Ophthalmological Society: Transactions, American Review of Tuberculosis, Annals of Internal Medicine, Annals of Otology, Rhinology and Laryngology, Annals of Surgery, Archives of Dermatology and Syphilology, Archives of Disease in Childhood, Archives of Internal Medicine, Archives of Neurology and Psychiatry, Archives of Ophthalmology, Archives of Otolaryngology, Archives of

Pediatrics, Archives of Physical Medicine, Archives of Surgery, The Australian and New Zealand Journal of Surgery, The Australasian Journal of Pharmacy, The Australian Journal of Dentistry, Blood, Brain, British Encyclopedia of Medical Practice: Progress Volumes and Supplements, British Heart Journal, British Journal of Anaesthesia, The British Journal of Ophthalmology, British Journal of Physical Medicine, British Journal of Radiology, The British Journal of Surgery, British Medical Bulletin, British Medical Journal, Bulletin of the History of Medicine, Canadian Journal of Public Health, The Canadian Medical Association Journal, The Clinical Journal, Gastro-enterology, The General Practitioner, Glasgow Medical Journal, Guy's Hospital Gazette, Indian Journal of Radiology, Indian Medical Gazette, Industrial Medicine, Bulletin of the Johns Hopkins Hospital, Journal of Allergy, The Journal of the American Medical Association, The Journal of Bone and Joint Surgery, The Journal of Clinical Investigation, The Journal of General Physiology, The Journal of Laryngology and Otology, The Journal of Mental Science, Journal of Neurology, Neurosurgery and Psychiatry, The Journal of Obstetrics and Gynaecology of the British Empire, The Journal of Pathology and Bacteriology, Journal of Pediatrics, Journal of Physiology, The Journal of Tropical Medicine and Hygiene, The Journal of Urology, The Lancet, The Laryngoscope, Mayo Clinic and Mayo Foundation: Collected Papers, The Medical Annual, Medical Clinics of North America, The Medical Journal of Australia, The Medical Press and Circular, Medical Record, Medical Research Council: Special Report Series, Medicine, The New England Journal of Medicine, The New Zealand Medical Journal, Ophthalmic Society of Egypt: Bulletin, Ophthalmic Society of the United Kingdom: Transactions, Ophthalmological Society of Australia (British Medical Association): Transactions, Overseas Post-Graduate Medical Journal, Philadelphia College of Physicians: Transactions, The Practitioner, The Prescriber, La presse médicale, The Quarterly Journal of Medicine, Radiology, Journal of the Royal Army Medical Corps, Royal Australasian College of Physicians: Proceedings, Royal Melbourne Hospital: Clinical Reports, Royal Society of Medicine: Proceedings, South African Medical Journal, Surgery, Gynecology and Obstetrics, United Nations: Estimated World Requirements of Dangerous Drugs, United Nations: Report of Permanent Central Opium Board, The Urologic and Cutaneous Review, Venereal Disease Information, West London Medical Journal, Year Book of Dermatology and Syphilology, Year Book of Endocrinology, Metabolism and Nutrition, Year Book of Eye, Ear, Nose and Throat, Year Book of General Medicine, Year Book of General Surgery, Year Book of Neurology, Psychiatry and Neurosurgery, Year Book of Pediatrics.

NOTICE.

THE General Secretary of the Federal Council of the British Medical Association in Australia has announced that the following medical practitioners have been released from full-time duty with His Majesty's Forces and have resumed civil practice as from the dates mentioned:

- Dr. H. Seamonds, 24, Dover Road, Rose Bay (October 17, 1947).
 Dr. A. N. B. Fitzhardinge, 12, Butler's Road, Hurstville (September 8, 1947).
 Dr. A. R. Woolnough, 111, Macquarie Street, Parramatta (May 25, 1946).

Medical Societies.

MELBOURNE PÆDIATRIC SOCIETY.

A MEETING of the Melbourne Pædiatric Society was held on April 9, 1947, at the Children's Hospital, Carlton, Melbourne, Dr. JOHN B. COLQUHOUN, the President, in the chair. Part of this report appeared in the issue of November 29, 1947.

Œsophageal Diverticulum.

DR. RAYMOND HENNESSY showed a girl, aged six years, who had an uncommon developmental anomaly of the œsophagus, namely, a diverticulum of the intrathoracic portion of the œsophagus. Dr. Hennessy said that the usual diverticula or pouches affecting that portion of the œsophagus were multiple, in them the fundus was proximal to the orifice, they were acquired, and they caused no dysphagia.

In the patient presented, the pouch was solitary, its fundus was distal to the orifice, it was congenital, and it was causing much dysphagia.

Dr. Hennessy said that the child had been sent to the Children's Hospital from the Queen Victoria Hospital with an X-ray photograph showing the condition quite well. She was then fourteen months old, and was showing inability to swallow semisolid and solid foods. She had been under observation ever since. Three œsophagoscopy examinations had been made within a short period. The œsophagoscope could be passed with ease into the diverticulum, but there was great stenosis of the œsophagus at the mouth of the pouch and behind the pouch, so that only the smallest bougie could be passed onwards to the stomach. There was a very strong fibrous, almost tendinous, partition between the œsophagus and the diverticulum. Œsophageal examinations had been made from time to time, the last being in August, 1946. A gastrostomy had been performed, but the mother was never very keen on the procedure, and the tube came out after a few months. The opening had not been reestablished, so that the child was solely dependent on natural swallowing for nourishment. Her food was very restricted, for she had never been able to swallow any meat or fish. The patient had now had her sixth birthday. Although she was able to carry on fairly well, her appearance showed some stigmata of malnutrition. Dr. Hennessy said that his reason for showing the patient was that he thought that she should have the benefit of modern opinion on intrathoracic surgical procedures. He thought that it was possible that the condition might be susceptible to surgical treatment with modern methods and techniques. The alternative to any intrathoracic surgical treatment appeared to be a permanent gastrostomy opening, which Dr. Hennessy thought would become necessary soon, for there would be an increase in the child's malnutrition as she grew older.

DR. RUSSELL HOWARD said that it appeared that some treatment would shortly be necessary so that the child could obtain adequate food intake. He considered that surgical intervention was indicated, and that it might prove possible to perform anastomosis of the fundus of the stomach with either the pouch (should it have a muscle coat) or with the œsophagus above the pouch (should the former method prove impossible). The approach would be a thoraco-abdominal one with incision of the diaphragm. Dr. Howard said that such operations, for other conditions demanding œsophagectomy, were now not so very uncommon, and that, although the mortality might be considerable, the end result in successful cases should be very satisfactory. He recommended exploration with a view to examining the possibilities of the procedure suggested.

DR. ALAN PENINGTON said that the patient's condition offered some interesting features for comment. The commonest site for such pouches was in the region of the bifurcation of the bronchi, where they were relatively easily attacked by simple excision. A diverticulum situated as high as that was difficult to understand and to treat. The operation of œsophago-gastrostomy had been performed in Melbourne. He knew of at least three such cases at the Royal Melbourne Hospital. The operations had been carried out for carcinoma of the middle or lower third of the œsophagus. In Dr. Hennessy's patient the disorder affected the upper third of the œsophagus, and Dr. Penington said that he doubted whether it would be possible to perform an œsophago-gastrostomy. Repair of the stoma was a very difficult matter. There was no serous coat to the œsophagus, and the anastomosis had to be done with muscle suture. A tear would result in suppurative mediastinitis. Dr. Penington suggested that the first procedure might be simple exploration. No harm would follow this; it would allow a more leisurely consideration of the pathology, and many problems might be elucidated.

DR. REGINALD WEBSTER said that he had never seen a pouch in the situation described. He agreed with Dr. Howard that such pouches consisted principally of mucosal layers, and very little muscle tissue was present.

Dr. Hennessy, in reply, said that his impression was that if operation was to be contemplated, the operation would be œsophagectomy. He did not think that the pouch was necessarily consequential on the stricture. The condition might be looked upon as just a gross error of development of the proximal half of the œsophagus. It was impossible to assess precisely from the radiological findings what was actually present. An exploratory operation would be a wise procedure, and would help to clarify the actual state of affairs.

A Case for Diagnosis.

DR. ROBERT SOUTHEY presented a female child, aged seven years, with an unusual blood dyscrasia. She had been

admitted to the Children's Hospital, Melbourne, with a three months' history of anorexia, vomiting, dizzy turns, listlessness and progressive loss of weight. Examination of the blood at that stage had revealed a hæmoglobin value of 45%. The red blood cells numbered 2,150,000 per cubic millimetre, and the white cells 2200 per cubic millimetre; of these 10% were polymorphonuclear leucocytes and 86% lymphocytes. The blood smear revealed anisocytosis and polychromasia; some normoblasts were present. The proportion of reticulocytes was 10%. The icteric index was 7.5. The corpuscular fragility test yielded normal figures. An occasional leucocyte only was visible on microscopic examination of the urine. The child's blood was of the O IV group and was Rh-negative. No free hydrochloric acid was present in the fasting gastric content. A bone marrow smear showed acute erythropoiesis in all stages and granulocytopenia.

Dr. Southby said that the child had been treated with intensive liver therapy—twenty millilitres of "Campolon" intramuscularly—but there was a lack of response, the reticulocyte count never rising above 10%, and the hæmoglobin value remaining at 45%. However, after transfusions of three pints of O IV Rh-negative blood were given there was marked clinical improvement, the hæmoglobin value being elevated to 85%. After a period of two months in hospital the patient had been sent home on January 4, 1947, but readmission was necessary on February 24, 1947, because of the return of former symptoms which apparently had occurred two weeks after the patient's discharge. At this stage the child was febrile, the temperature being 103° F. and the pulse rate 150 per minute. She was icteric. A focus of infection was discovered in the throat, for the fauces were reddened. Blood examination showed the hæmoglobin value to be 46%. The red cells numbered 2,100,000 per cubic millimetre and the white cells 1200 per cubic millimetre, of which 12% were polymorphonuclear leucocytes and 87% lymphocytes. Clinical improvement followed immediate transfusion with one pint of compatible blood. On the second day the temperature was 105° F. and examination of the throat revealed a membrane all over the left tonsil. A swab taken of this yielded no evidence of Klebs-Löffler bacillus. The infection was combated successfully with 15,000 units of penicillin given at three hourly intervals by the intramuscular route.

To stimulate granulocytosis, 40 millilitres of "Pentnucleotide" were given daily for four days, and then 30 millilitres daily. However, the response after ten days was disappointing, for the white cells numbered 1800 per cubic millimetre, of which 32% were polymorphonuclear leucocytes and 68% lymphocytes. In addition the hæmoglobin value had again fallen to 53%, and the number of red cells to 2,160,000 per cubic millimetre. Therefore a further transfusion of 30 ounces of compatible blood was given, with satisfactory clinical improvement, the hæmoglobin value being elevated to 91%.

Dr. Southby went on to say that the blood condition had later relapsed, the last blood examination just before the meeting showing the hæmoglobin value to be 50% and the number of red cells 2,580,000 per cubic millimetre. There were now 3000 white cells per cubic millimetre, 90% being lymphocytes and less than 10% polymorphonuclear leucocytes.

Dr. Southby said that he thought that the case fell into the group described recently as primary splenic panhæmatopenia, and he felt that it would be justifiable to submit the child to splenectomy.

Dr. STANLEY WILLIAMS supported Dr. Southby's conception of the case and his suggestion for splenectomy.

Dr. JOHN COLEBATCH said that he thought that the patient's condition was one of severe anaemia with a severe agranulocytic phase. It differed from panhæmatopenia in that the patient had an appreciable degree of hemolysis. Obscure hæmolytic anæmias were commonly due to some disturbance of the reticulo-endothelial system. As the diagnosis was still obscure and the condition was not characteristic of primary splenic panhæmatopenia, he recommended conservative measures, perhaps with deep X-ray therapy, if this was thought to be justified.

Dr. Southby, in reply, added that an X-ray examination of the chest had been made early to exclude a mediastinal lesion.

Retinoblastoma.

Dr. STANLEY WILLIAMS presented a female child, aged three years, who one year previously had had the right eye removed because of the presence of a retinoblastoma. The diagnosis was confirmed by microscopic examination after enucleation. Following the operation the child had remained quite well until two weeks before admission to the Children's

Hospital, when she commenced having persistent vomiting. On admission she was dehydrated, thin and drowsy, but could be roused. She wore an artificial eye in the right orbit. Examination of the central nervous system clinically did not reveal localizing signs of the tumour. There was increased intracranial pressure, demonstrable chiefly by radiography of the skull. A ventriculogram prepared by Dr. R. Hooper showed dilatation of the right lateral ventricle and evidence of internal hydrocephalus.

Dr. Williams said that retinoblastoma was a malignant tumour, originating from embryonal cell nests in the chorioid. The disease might be familial, though such a relationship did not exist with the child shown, as far as could be determined. In the case under discussion the primary disease in the right eye had not been followed by the presence of a similar tumour in the other eye, but direct spread from the original tumour had occurred along the optic nerve to cause, some twelve months later, signs of an intracranial tumour.

Dr. ALAN PENINGTON said that there was not much doubt as to the familial nature of the complaint. Monocular twins had been affected. With binocular twins, one was affected and the other was not. The condition was met with under the age of three years and was curiously bilateral. Usually the child was noticed by one of the parents to have a white spot in the eye. The physician observed a white reflex on ophthalmoscopic examination. Such patients should be thoroughly investigated. The method of spread was from the posterior to the anterior chamber, with secondary deposits on the iris. At some time spread occurred through the optic nerve, so that the pathologist was always asked to examine a section of the optic nerve for tumour cells. It was important to remember that these tumours were not uncommon. Dr. Penington said that he had seen three instances at the Eye and Ear Hospital during the previous four months. The tumours were very radio-sensitive.

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

Overseas Lecturers.

THE Post-Graduate Committee in Medicine in the University of Sydney announces that advice has been received from the United States of America that Dr. Earl R. Carlson's visit to Sydney in December has been postponed until the new year. It is not expected that Dr. Carlson, who is an authority in cerebral palsy, will arrive before April, 1948. Further details will be announced at a later date.

Course in Advanced Surgery.

The course in advanced surgery will be held for twelve weeks beginning January 19, 1948. During this course general pathology lectures will be held twice a week in the afternoons. Other lectures of special interest included in this course are "Endocrinology of the Ovary, Thyroid, Adrenal and Pancreas Glands", "General Principles of Bacteriology and Immunology", "Blood Transfusion and the Rh Factor", "Meningitis", "Cerebro-Spinal Fluid", "Chemotherapy" and "Bacteriology of Wound Infections".

Applications to attend either part or the whole of this course should be made at an early date to the Course Secretary, Post-Graduate Committee in Medicine, 131, Macquarie Street, Sydney. Telephones: BW 7483 and B 4606.

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 222, of November 20, 1947.

AUSTRALIAN MILITARY FORCES.

Australian Army Medical Corps.

20th Australian Field Ambulance.—The following officers are transferred from Australian Army Medical Corps (Medical) Reinforcements, 13th June, 1947: Captains TX16303

K. L. Wise and NX502739 C. Radeski. The following officers are placed upon the Regimental Supernumerary List: NX204019 Captain (Temporary Major) E. G. Laver, 23rd June, 1947, and NX207589 Captain H. A. J. Lister, 13th June, 1947.

SX500729 Honorary Captain G. G. Wyllie is appointed from the Reserve of Officers (Australian Army Medical Corps) and to be Captain, 21st June, 1947.

QX501694 Honorary Captain L. R. L. Monogue is appointed from the Reserve of Officers (Australian Army Medical Corps) and to be Captain, 24th June, 1947.

Reserve of Officers.

Australian Army Medical Corps.

The undermentioned officers are transferred to the Reserve of Officers on the dates indicated. Where applicable, they cease to be seconded and relinquish any temporary rank held with effect from the date of transfer to the Reserve of Officers:

20th Australian Camp Hospital.—VX96338 Captain M. J. L. McGrath, 5th July, 1947.

NX208065 Captain G. K. Vanderfield, 22nd July, 1947.
No. 113 (Concord) Military Hospital.—Captains NX207951 C. H. Thorburn, 12th July, 1947, and NX204412 R. N. Henniker, 15th July, 1947.

16th Australian Camp Hospital.—NX208037 Captain F. C. Byrnes, 17th July, 1947.

90th Australian Camp Hospital.—VX97383 Captain W. J. Jamieson, 16th July, 1947.

20th Australian Field Ambulance.—NX207589 Captain H. A. J. Lister, 17th July, 1947.

Permanent Supernumerary List.

Australian Army Medical Corps.

The notification respecting VX18194 Captain J. F. Akeroyd which appeared in Executive Minute No. 54 of 1947, promulgated in *Commonwealth Gazette* No. 85 of 1947, is withdrawn.

VX18194 Captain J. F. Akeroyd is placed upon the Retired List and is granted the honorary rank of Major with permission to wear the prescribed uniform, 15th January, 1947.

Reserve Citizen Military Forces.

Australian Army Medical Corps.

2nd Military District: To be Honorary Captain, 10th July, 1947.—George Edward Hession.

4th Military District: To be Honorary Captain, 10th July, 1947.—Robert Austin Kenihan.

1st Military District.—The following officers are retired: Lieutenant-Colonel J. C. Hemsley, Honorary Lieutenant-Colonels J. Hardie, M.C., and V. McDowall, Majors M. J. Mackerras, E. Mansfield, C. C. Minty, M.C., and J. L. Simmonds, Captains E. J. Burton and H. Green, 6th August, 1947, F. W. R. Lukin, 30th August, 1947, S. P. McCafferty, W. J. T. Neal, D.C.M., and F. N. Phillips, Honorary Captains J. S. Barr-David, F. R. Benson, E. W. Chenoweth, H. W. Harblson, F. A. Perkins, W. D. Ryan, A. W. St. Ledger and V. R. Woodhill, and Lieutenants S. H. Christian, F. A. Gunther and J. R. H. Seaton, 6th August, 1947.

Special Correspondence.

CANADA LETTER.

FROM OUR SPECIAL CORRESPONDENT.

THIS month has been marked by the holding of the first examinations for certification of specialists in Canada under the Royal College of Physicians and Surgeons. There are two types of examinations, one merely for certification as a specialist, and the other of a more senior nature, that of Fellowship in the Royal College, either as F.R.C.P. (C) or F.R.C.S. (C). It is an interesting experiment in medical education alone, not to mention the benefits to be derived by the public from this thorough-going delineation of especially qualified practitioners. The primary requirement is that a doctor shall have studied or practised medicine for at least five years after graduation before attempting either the certification or the fellowship examinations. There are no "primaries" as of old. The subjects of anatomy, biochemistry, physiology, pathology and bacteriology are written at the same time as the clinical papers, but the

emphasis in the basic sciences is made on the clinically applied sphere.

The specialties recognized on the surgical side are: neurosurgery, genito-urinary surgery, orthopaedic surgery, and gynaecology and obstetrics. These are in addition to general surgery, which still remains the keystone of the F.R.C.S. Those writing in a specialty must answer two out of the four questions on the general surgery paper, and in addition, two compulsory questions in the specialty. The same holds in the medical specialties, which are neurology and/or psychiatry, dermatology and syphilology, paediatrics, and radiology (diagnostic and/or therapeutic). This division of examination questions holds in all three papers: (a) clinical medicine; (b) pathology and bacteriology; (c) anatomy, physiology and biochemistry. The oral examinations are conducted by one physician, one specialist and one pathologist.

The Ontario Medical Association has announced the terms of its new medical care prepayment plan. The cost to the average family is stated to be in the neighbourhood of \$80 per year. Blue Cross hospitalization insurance would cost another \$20 annually. The first reports of the effect of compulsory hospitalization insurance in Saskatchewan show that the financial condition of many hospitals has improved immeasurably since its introduction last year. The prospects for a university hospital in Saskatoon on this basis are very bright, and it is hoped that no case will be lost to teachers and research workers for lack of money to finance protracted hospitalization if required.

A ninetieth birthday celebration is being arranged by the Montreal Neurological Institute for Sir Charles Sherrington to take place in early December. His past students, Dr. Wilder Penfield, Dr. Hebbel Hoff and Dr. W. C. Gibson, will take part in the exercises.

Correspondence.

LOCAL ANÆSTHESIA IN OBSTETRICS.

SIR: It is gratifying to read at last of an attempt to stimulate the use of local infiltrative anaesthesia in the operation for Caesarean section, and I would like to congratulate Dr. Mackey on his presentation of the method.

As he states, there are no contraindications and the method is 100% safe for mother and babe. In a previous communication I stressed this, and would like to mention again that since adopting this method three years ago I have seen no reason to change in either my own cases or those referred to me by others.

Yours, etc.,

J. LLOYD SIMMONDS.

Wickham House,
Wickham Terrace,
Brisbane.
November 18, 1947.

LOST: A SELF-RETAINING RETRACTOR.

SIR: I have for some months now been unable to trace a self-retaining retractor with scissor action, about eight inches long and with detachable curved blades.

It occurs to me it may have been mistakenly packed in another surgeon's bag and he have no idea whose it is. It is, however, marked C.C.McK.

Yours, etc.,

C. C. MCKELLAR.

143, Macquarie Street,
Sydney.
November 24, 1947.

AN UNUSUAL CASE OF HERPES ZOSTER.

SIR: The following case of *herpes zoster* presented clinical features which seemed to me to be sufficiently uncommon to warrant its reporting in the pages of this journal.

The patient, a woman, aged seventy-two years, consulted me at the dermatological out-patient department of a metropolitan hospital on September 24, 1947. She complained of a painful eruption involving the left side of her face and forehead of four days' duration. On clinical examination the eruption was seen to be a fairly severe *herpes zoster* involving the branches of the first and second divisions of the fifth left cranial nerve; there was no corneal ulceration nor other eruption, but there was marked red-

dening of the conjunctival sac. The patient was ordered injections of ptiluitrin and thiamin and instructed to report at the hospital daily for local dressings and treatment and observation of the affected eye.

One week later I was again consulted by the patient, who stated that several days after the first visit she developed pain radiating around from the right lumbar region to the right lower abdomen, followed by an eruption which her daughter, who accompanied her, stated as being very like the rash on the left side of the face. On examination typical lesions of *herpes zoster* were seen involving the area above described, namely, the lower right thoracic segments.

One sees numerous examples of *herpes zoster* affecting many different segments of the cranial and spinal nervous systems. Cases involving nearby segments at one time are not uncommon. Recurrent examples of *herpes zoster* are rarely but occasionally seen. *Herpes zoster* with a generalized varicelliform eruption may also be seen.

It is very rare, however, to see widely separated segments on opposite sides of the body affected at almost the same time, as this example, though this has been described in the literature.

Yours, etc.,

W. KEITH MYERS.

135, Macquarie Street,
Sydney,
Undated.

Obituary.

LESLIE ST. VINCENT WELCH.

We are indebted to Dr. Jack Bean for the following appreciation of the late Dr. Leslie St. Vincent Welch.

During his twenty-one years as Chief Medical Officer for School Medical Services, Queensland (July 1, 1926, to June 30, 1947), Leslie St. Vincent Welch gave wholehearted enthusiasm with administrative and creative resourcefulness of a high order. In spite of years of financial depression and monetary resources always too limited, he contrived some wonderfully effective and constructive pioneering for the health and happiness of "Young Queensland".

Above all, he should be for ever honoured—and his memory cherished—as the real founder of that splendid institution at Wilston (Brisbane), the Wilson Ophthalmic Hostel. This has saved and improved the sight of very large numbers of Queensland's school children cursed with trachoma. Equally it has educated and refined them and taught them good hygiene—not of eyes only, nor even general habits of physical cleanliness alone, but wholesome social hygiene in the broadest and most æsthetic sense. His report to the Government on his pioneering survey of the trachomatous "Far West" was a masterpiece of cogently lucid presentation and noble appeal. He freely illustrated it with his own photographs of the conditions outback which had so shocked him. In turn, by these photographs and by his coercive arguments and appeals, he shocked the authorities into action, so that after a long, hard labour the hostel was brought to birth.

Another major pioneering achievement was his introduction of rail car dental clinics. The school dentist and his mechanic not only worked in these but lived in them. I believe Welch originated the whole thing himself, and took a major hand in the constructive designing of these rail cars, too. Having had two years in the engineering school of the University of Sydney before turning to medicine and being innately resourceful and inventive, Welch was well equipped to launch a new major convenience like this. Coupled to some "Far West" train, the rail car was towed to the "out-back" rail head and shunted to its siding. All accessible schools in the district round the railhead would send in their pupils. For inaccessible schools a two-seater motor-car was used, mounted behind the rail car proper on an attached "platform-carriage".

Welch also did effective planning in the Queensland anti-hookworm campaign in collaboration with Sir Raphael Cilento and (I think) Dr. Coffey.

When the two infantile paralysis epidemics smote Brisbane in 1931-1932 and 1937-1938 Welch took immediate countering action, which in the second of the two probably helped considerably to protect the children and limit spread, so far as school spread is concerned. He was keenly interested and considerably successful in the promotion of nutritious and balanced school lunches (Oslo type), and in arranging for either free or very cheap bulk distribution of pasteurized milk at the schools. Moreover (again by the use of his

camera) he demonstrated to the education authorities the gross wastage of school lunch food materials which was fairly widespread even in those years of the big financial depression. The school authorities took immediate steps to prevent this wastage. Welch to a remarkable degree secured loyal, enthusiastic and affectionate cooperation from his subordinates, and was most successful in building up a strong team spirit amongst them.

Another achievement and interest was his scheme (working in collaboration with various others, but himself always, I would say, the hub of it all) to bring "Far West" and "backblock" children down for holidays to camps or hostels on the Queensland coast near Burleigh and Southport—a scheme very similar to the Far West Children's Health Scheme operating throughout New South Wales and with headquarters at Manly. It was whilst attending a committee meeting of this organization that Welch collapsed with heart failure on Sunday, August 17, 1947, and he died at 5 p.m. on the following Wednesday (August 20).

Welch had a charmingly courteous and polished personality, a beautifully modulated and refined voice in speech, and always a kind and sympathetic heart. He was a most gifted man in various ways and a clever mimic and raconteur when his mood and company incited him to it. By nature he was cordially hospitable, and he retained always a strong streak of boyishness in his richly complex make-up. He kept himself well up to date in general medicine, compelling himself to read by the ingenious device of writing weekly articles on all phases of popular medicine (under a *nom de plume*) for one of the daily papers. Apart from his school work his music was his chief enthusiasm. In his youth he had practised six hours daily at the violoncello, intending to become a concert virtuoso. He remained always a fine player, and usually organized a first-rate trio or quartet for the chamber music he so loved. Perhaps his rich heredity accounted for his colourful, complex nature and his markedly "artist temperament". His great-grandmother had hobnobbed over the garden fence with the mother of Napoleon Bonaparte; they were Corsicans, neighbours and cronies. Welch claimed relationship too with Thackeray, the great novelist; another earlier forebear was the fiery, ranting, fist-hammering Scottish divine, John Knox. Another relative was Lucy Kemp Welch, the famous animal painter.

Welch's capacity for hard, unremitting, all-out work was remarkable. He died in harness, "fully used up"—Bernard Shaw's chosen end, and just what Welch himself would most have wished. Beyond all doubt "Young Queensland" owes him deep gratitude and esteem for his lavished services and sacrifices. His "Wilson Hostel" is his best memorial and monument. *Ave atque vale!*

Australian Medical Board Proceedings.

TASMANIA.

THE undermentioned have been registered, pursuant to the provisions of the Medical Act, 1918, of Tasmania, as duly qualified medical practitioners:

Webb, Arthur Lionel Bridges, M.B., B.S., 1924 (Univ. Melbourne), 85, Spring Street, Melbourne.
Wain, Charles Russell, M.B., B.S., 1946 (Univ. Melbourne), Launceston General Hospital, Launceston.
Leembruggen, William Malcolm Gibson, M.B., B.S., 1942 (Univ. Melbourne).

QUEENSLAND.

THE undermentioned have been registered, pursuant to the provisions of The Medical Acts, 1939 to 1946, of Queensland, as duly qualified medical practitioners:

Farnworth, John Kyrle, M.B., B.S., 1947 (Univ. Queensland), Minnie Street, Southport, Queensland.
Barbour, John Gordon, M.B., B.S., 1945 (Univ. Sydney), Hotel Tully, Tully.
Le Breton, Eugene Granville, M.B., B.S., 1947 (Univ. Queensland), Thynne Road, Morningside, Brisbane, E.I.
Rimington, Ronald Arthur, M.B., B.S., 1946 (Univ. Melbourne), General Hospital, Townsville.
Sutcliffe, Muriel Mary Helme, M.B., B.S., 1947 (Univ. Sydney), General Hospital, Brisbane.

Allen, Trevor, M.B., B.S., 1942 (Univ. Sydney), Renwick Street, Toronto, New South Wales.

Neal, Bernard William, M.B., B.S., 1947 (Univ. Melbourne), Mater Public Hospital, South Brisbane.

Wilson, Raymond Allan, M.B., B.S., 1947 (Univ. Sydney), Mater Misericordiae Hospital, South Brisbane.

The following additional qualification has been registered:

Wood, Charles Holden, Kingaroy, B.S. (Univ. Sydney), 1942.

Nominations and Elections.

The undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Pantle, George Constantine, M.B., B.S., 1947 (Univ. Sydney), Base Hospital, Orange.

Elb, Philipp, M.B., B.S., 1946 (Univ. Sydney), 2, Waters Road, Cremorne.

THE FEDERAL MEDICAL WAR RELIEF FUND.

The following contributions to the Federal Medical War Relief Fund have been received:

New South Wales.

H. C. Barry, £5 5s.

J. M. Wilshire, £2 2s.

H. O. Chapman, £1 1s.

Total: £8 8s.

Grand total: £19,619 14s. 6d.

Notice.

A MEETING of the obstetric staff of the Women's Hospital, Melbourne, will be held on Thursday, December 11, 1947, at 8.15 o'clock p.m. in the Pathology Lecture Theatre. Dr. Kate Campbell will speak on "Intracranial Trauma in the Newborn". All members of the British Medical Association are invited to attend.

Corrigendum.

In the issue of November 29, 1947, at page 672, in the report of a meeting of the Melbourne Paediatric Society held on April 9, 1947, reference was made to a report of a case by Dr. H. Boyd Graham entitled "Acute Agranulocytosis with Recovery", and it was stated that this paper appeared at page 649. The paper was in fact published in the issue of October 11, 1947, at page 451. We apologize to Dr. Boyd Graham for this mistake.

Medical Appointments.

Dr. K. J. M. Watson has been appointed government medical officer at Dalby, Queensland.

Books Received.

"Problems of Early Infancy", edited by Milton J. E. Senn; 1947. New York: Josiah Macy, Junior, Foundation. 9" x 6", pp. 70. Price: \$0.75.

"Pictorial Handbook of Fracture Treatment", by Edward L. Compere, M.D., F.A.C.S., Sam W. Banks, M.D., F.A.C.S., revised with the assistance of Clinton L. Compere, M.D., F.A.C.S., illustrated by Harold Laufman, M.D., F.A.C.S.; Second Edition; 1947. Chicago: The Year Book Publishers Incorporated. 8" x 5½", pp. 390, with many illustrations. Price: \$5.50.

"Practical Clinical Psychiatry", by Edwards A. Strecker, A.B., A.M., Sc.D., Litt.D., LL.D., M.D., Franklin G. Ebaugh, A.B., M.D., and Jack R. Ewalt, M.D.; Section on Psychopathologic Problems of Childhood, by Leo Kanner, M.D.; Sixth Edition; 1947. Philadelphia and Toronto: The Blakiston Company. 9" x 6", pp. 486, with illustrations. Price: \$5.00.

"Headache", by Louis G. Moench, M.D.; 1947. Chicago: The Year Book Publishers, Incorporated. 8" x 5½", pp. 208, with many illustrations. Price: \$3.50.

"The Selected Writings of Benjamin Rush", edited by Dagobert D. Runes; 1947. New York: Philosophical Library. 8" x 5½", pp. 448. Price: \$5.00.

"Medicine, Psychiatry and their Borderland", by Alexander Frank, M.D.; 1947. London, Sydney, New York: Shakespeare Head Press Proprietary, Limited. 8½" x 5½", pp. 238. Price: 21s.

Diary for the Month.

- DEC. 8.—Victorian Branch, B.M.A.: Executive Meeting.
 DEC. 9.—Tasmanian Branch, B.M.A.: Ordinary Meeting.
 DEC. 9.—New South Wales Branch, B.M.A.: Ethics Committee. Medical Politics Committee.
 DEC. 10.—Victorian Branch, B.M.A.: Council Meeting.
 DEC. 11.—New South Wales Branch, B.M.A.: Branch Meeting.
 DEC. 12.—Queensland Branch, B.M.A.: Annual Meeting.
 DEC. 19.—Queensland Branch, B.M.A.: Council Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phoenix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute; Brisbane City Council (Medical Officer of Health). Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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